NASA SP-7011 (146)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 146)

OCTOBER 1975

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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NASA SP-7011 (146)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 146)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in September 1975 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 223 reports, articles and other documents announced during September 1975 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)* The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals This procedure, which saves time and money, accounts for the slight variation in citation appearances

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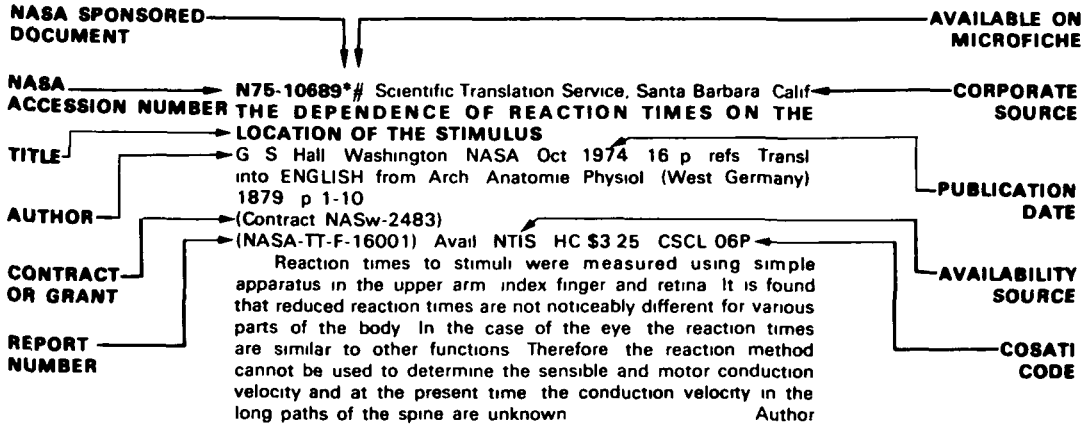

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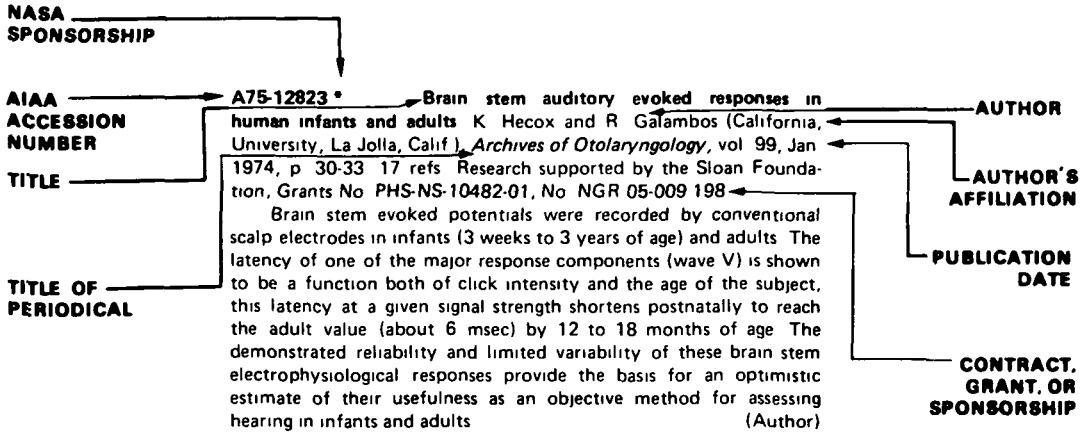

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 146) OCTOBER 1975

IAA ENTRIES

A75-35900 * **The effects of malnutrition on the developing brain stem of the rat - A preliminary experiment using the lateral vestibular nucleus** J E Johnson, Jr and R A Yoesle (NASA, Ames Research Center, Neurosciences Branch, Moffett Field, Calif) *Brain Research,* vol 89, 1975, p 170-174 9 refs NASA Task 970-21-11 11

A75-35901 * **Soil sterilization effects on in situ indigenous microbial cells in soil** D P Labeda, D L Balkwill, and L E Casida, Jr (Pennsylvania State University, University Park, Pa) *Canadian Journal of Microbiology,* vol 21, no 3, 1975, p 263 269 27 refs Grant No NGR-39-009-180

Soil sterilized in various ways was evaluated by transmission electron microscopy, viewing the thin sectioned preparations and replicas of frozen-etched preparations to determine the types of sterilization which would either destroy or leave unaltered the cellular structure of the indigenous microorganism The cellular fine structure was altered or destroyed by the heat treatments but was not affected by the other treatments with OsO4, Co 60 radiation, prolonged autoclaving and glutaraldehyde The results are discussed (1) in relation to the residual biological information observable by electron microscopy in soil samples which have been sterilized to eliminate possible pathogens before handling of the soil, and (2) with the objective of obliterating the fine structure of the indigenous microorganisms during soil sterilization so that electron microscopy studies can be made of microorganisms inoculated into and grown in the presterilized soil M G

A75-35902 * **Simplified procedures for releasing and concentrating microorganisms from soil for transmission electron microscopy viewing as thin-sectioned and frozen-etched preparations** D L Balkwill, D P Labeda, and L E Casida, Jr (Pennsylvania State University, University Park, Pa) *Canadian Journal of Microbiology,* vol 21, no 3, 1975, p 252 262 13 refs Grant No NGR-39-009-180

A75-35979 # **Motion of pendulum-type biped systems (Peredvizhenie dvunogikh sistem maiatnikovogo tipa)** V B Larin *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela,* Mar - Apr 1975, p 58-61 6 refs In Russian

Vukobratovich et al (1972) have studied biped mechanisms in which the motion of the compensating mass is a major element of the system dynamics The dynamic processes involved in the motion of biped walking mechanisms without a compensation mass are analyzed, and problems associated with controlling and stabilizing the motion of such mechanisms are examined V P

A75-36070 **Conduction cardiograph-bundle of His detector.** L Siegel, E B Mahoney, J A Manning, and S Stewart (Rochester, University, Rochester, N Y) *IEEE Transactions on Biomedical Engineering,* vol BME-22, July 1975, p 269-274 8 refs

Heart block is a potential complication in the surgical repair of several congenital cardiac defects The proximity of the bundle of His to these defects makes their repair particularly hazardous Earlier workers devised a method for the anatomic localization of portions of the conduction system at the time of cardiotomy This method is inefficient and time-consuming and therefore has not received general acceptance This paper describes an instrument which expands upon that method to facilitate and expedite the localization process This should enhance the overall utility of the method The instrument is self-contained, reduces the signal complexity arriving from the exploring probe, analyzes the waveforms and responds instantly with an audible tone when the probe overlies the bundle of His (Author)

A75-36071 **Miniaturized electrode for on-line PO2 measurements.** G Eden, G F Inbar (Technion - Israel Institute of Technology, Haifa, Israel), I Timor-Tritsch (Rambam Government Hospital, Haifa, Israel), and H I Bicher (Arkansas, University, Fayetteville, Ark) *IEEE Transactions on Biomedical Engineering,* vol BME-22, July 1975, p 275-280 7 refs Research supported by the Mediscience Corp

A new method of constructing miniaturized Clarke-type electrodes that can be fabricated en masse is described These electrodes, which have typical Clarke electrode characteristics, are very small, thus allowing on-line monitoring, they are also very easy and inexpensive to manufacture Real-time monitoring of PO2 is essential since continuous information about this parameter is often necessary in operating theaters, open-heart surgery, postoperative care units, coronary care units, intensive care of premature babies, and research S J M

A75-36072 **A computerized system for optimal filtering of left ventricular pressure data** H Broman (Chalmers Tekniska Hogskola, Sahlgren Hospital, Goteborg, Sweden), J Kvasnicka (Karlova Universita, Hradec Kralove, Czechoslovakia), B Liander, and E Varnauskas (Sahlgren Hospital, Goteborg, Sweden) *IEEE Transactions on Biomedical Engineering,* vol BME-22, July 1975, p 287-292 5 refs. Research supported by the Swedish National Association against Heart and Chest Diseases.

On account of noise, considerable errors appear in standard and pressure-record estimates of left ventricular performance These errors can be reduced by adequate data processing A clinically useful criterion of such processing of left ventricular pressure is presented The reproducibility and clinical usefulness of the method are demonstrated by application to a number of experimental records as well as to a series of simulated pressure waves. (Author)

A75-36073 * **Continuous cardiac output measurement - Aspects of Doppler frequency analysis.** R S. MacKay and H B Hechtman (Boston University, Boston, Mass) *IEEE Transactions on Biomedical Engineering,* vol BME-22, July 1975, p 346-350 12 refs Grants No NGR-22-004-024, No NIH-7-915-00659

From the suprasternal notch blood flow velocity in the aorta can be measured non-invasively by a Doppler probe Integration over systole after frequency analysis gives a measure of stroke volume if a separate diameter observation is incorporated Frequency analysis by a zero crossing counter or by a set of parallel phaselock loops was less effective than a set of bandpass filters Observations on dogs, baboons and humans before and after exercise or surgery suggest the indications to be useful Application to judging heart failure by the effect of introducing a volume load is indicated Changes in output also are measured in freely moving subjects (Author)

A75-36074 **A concise parametric representation of electrocardiograms** S Maitra and S Zucker (Stanford University, Stanford, Calif) *IEEE Transactions on Biomedical Engineering,* vol BME-22, July 1975, p 350-355 13 refs

This work is directed toward reducing the number of parameters necessary to describe the electrical activity of the heart The approach taken is one of template matching using a linear combination of a set of template waveforms to fit a set of pattern waveforms Using selected electrocardiogram (EKG) waveforms as a template results in a great reduction in the number of parameters needed to match other EKGs (Author)

A75-36175 # **Prophylaxis of high-altitude decompression sickness during flights in depressurized cabins (Profilaktika vysotnoi dekompressionnoi bolezni v poletakh v razgermetizirovannoi kabine)** I N Cherniakov, I V Maksimov, V A Glazkova, and A S Tsivilashvili *Voenno-Meditsinskii Zhurnal,* Apr 1975, p 85-88 In Russian

Experiments are conducted to study the possibility of preventing decompression sickness during accidental depressurization of an aircraft cabin at altitudes above 7 km by means of desaturation performed in flight Desaturation is carried out using oxygen-respiratory equipment in conjunction with high-altitude gear, i e , under conditions of a moderately rarefied atmosphere while inhaling oxygen or air with increased oxygen content Experimental results show that breathing oxygen followed by an air-oxygen mixture or inhaling one mixture for 2-4 hr at altitudes of 4-4 5 km is an effective means of preventing decompression sickness during a long stay (24 hr) at altitudes of 11-12 km S D

A75-36326 **International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C , November 27-30, 1973, Proceedings** Edited by A Graybiel *Acta Astronautica,* vol 2, Mar -Apr 1975 206 p

The effects of weightlessness, cosmic radiation, and other space environment factors on human metabolism and organ function are investigated Studies reported concern characteristics of metabolism during prolonged water immersion, changes in vestibular function during space flight, otorhinolaryngological problems in medical support of space flights, effects of muscle electrostimulation during simulated weightlessness, postmission plasma volume and red-cell mass changes in the crews of the first two Skylab missions, and Skylab task and work performance (experiment M-151 - time and motion study)

S J M

A75-36327 **Study of water-salt metabolism and renal function in cosmonauts** Iu V Natochin, G I Kozyrevskaia, and A I Grigor'ev (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C , Nov 27-30, 1973) Acta Astronautica,* vol 2, Mar -Apr 1975, p 175-188 16 refs

The renal function and regulation of the water-salt balance were investigated in cosmonauts postflight and in earth-bound simulation experiments with the aid of water loading and hormonal injections Water- and ion-release were also studied during LBNP and physical exercises The cosmonauts who performed space flights of 2 to 5 days showed water retention and increased urine excretion of salts during the first postflight days in response to a water load After the 18-day flight water excretion remained unchanged whereas salt excretion increased The study of the hormonal effect in simulation experiments demonstrated a normal renal response to the hormonal excretion After the LBNP tests and physical exercises the water- and salt-excretion declined The data on the blood- and urine ionic composition, excretion of nitrogen metabolites, and hormones postflight as well as the results of load and functional tests suggest that changes in the renal function of cosmonauts in weightlessness are associated with regulatory effects on the kidney rather than disturbances in the function of nephron cells (Author)

A75-36328 **Characteristics of metabolism during prolonged water immersion** R A Tigranian (Akademiia Nauk SSSR, Moscow, USSR) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C , Nov 27-30, 1973) Acta Astronautica,* vol 2, Mar -Apr 1975, p 189 196 5 refs Translation

Twelve-day water immersion in a horizontal position was studied as a simulation of weightlessness in order to determine its effects on metabolism Parameters of protein metabolism, carbohydrate metabolism, acid-base equilibrium, enzyme activity, and steroid hormonal activity were studied Immersion was accompanied by increased residual blood N2, reduced blood creatine, increased urine creatinine and creatine, increased blood glucose and lactate, respiratory and metabolic acidosis, increased creatine phosphokinase and lactate dehydrogenase isoenzyme activity, and intensified glucocorticoid and androgenic function (indicating stress) S J M

A75-36329 **Subatmospheric decompression - Neurological and behavioural studies** A E Blagbrough and A N Nicholson (RAF, Institute of Aviation Medicine, Farnborough, Hants , England) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C , Nov 27-30, 1973) Acta Astronautica,* vol 2, Mar Apr 1975, p 197-206 15 refs

Several studies in animals over the past decade have shown that prolonged exposures to pressures within the range 226 mm Hg to 160 mm Hg (30,000 to 37,500 ft) are likely to lead to brain damage This often results in neurological and behavioral disturbance, which may be subtle and reversible or gross and ultimately fatal The appearance of these impairments is often delayed until several hours or even days after exposure Immediate survival does not necessarily ensure recovery In contrast, decompression to pressures below 160 mm Hg or above 226 mm Hg are unlikely to have adverse effects if the exposure is survived The most probable outcomes of such decompressions are death or uneventful recovery (Author)

A75-36330 **Changes in the vestibular function during space flight** N N Gurovskii, I I Brianov, and A D Egorov (Akademiia Nauk SSSR, Moscow, USSR) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C , Nov 27-30, 1973) Acta Astronautica,* vol 2, Mar -Apr 1975, p 207-216 26 refs

Past observations on vestibular-vegetative and vestibular-sensory disorders encountered during space flight are analyzed Disorders discussed include spatial illusions, vertigo, and kinetosis exacerbated by sudden head movements It is concluded that decisive factors in the development of motion sickness are the disturbance of the function of analyzers responsible for spatial orientation which take the form of sensory conflicts and the altered reactivity of the organism due to the hemodynamic rearrangement The vestibular problem as a whole and its various aspects, particularly those concerning selection, training, and medical support during flight, remain as urgent as before and require attentive investigation S J M

A75-36331 **Otorhinolaryngological problems in medical support of space flights.** I I Brianov, E I Matsnev, and I Ia Iakovleva (Institute of Biomedical Problems, Moscow, USSR) *(International Symposium on Basic Environmental Problems of Man*

in Space, 5th, Washington, D C, Nov. 27-30, 1973) Acta Astronautica, vol 2, Mar -Apr 1975, p 217-223 17 refs Translation

The vestibular, auditory, and clinical otorhinolaryngological aspects of otorhinolaryngology in space flight are separately reviewed The principal recent vestibulogical finding is the correlation of space sickness resistance with innate tolerance to ground stimulation and with special vestibular ground training In audiology, the effects of prolonged noise from the craft and from continuous two-way radio communication, particularly as regards predicting the reliability of the auditory analyzer in order to preserve high work capacity in crew members, take precedence Disorders of the mucous membrane and allergic lesions are the most important problems in the clinical ENT (ear, nose and throat) area, moreover, specialized crew training in the ENT field is vital, since immediate aid may have to be administered S J M

A75-36332 The control of posture and movements during REM sleep - Neurophysiological and neurochemical mechanisms O Pompeiano (Pisa, Università, Pisa, Italy) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D.C, Nov. 27-30, 1973.) Acta Astronautica*, vol 2, Mar -Apr 1975, p 225-239 63 refs Research supported by the Consiglio Nazionale delle Ricerche, Grant No NIH-NS-07685-06

Postural and motor events during REM (desynchronized) sleep and neurophysiological and neurochemical mechanisms involved in the control of these events are discussed It is concluded that the postural atonia typical of desynchronized sleep is due to postsynaptic inhibition of spinal motoneurons resulting from tonic activation of a bulbospinal inhibitory mechanism Evidence indicates that during REM sleep, cholinergic reticular neurons fire asynchronously, thus being able to trigger the bulbospinal inhibitory system responsible for the atonia S J M

A75-36333 Effects of muscle electrostimulation during simulated weightlessness. L I Kakurin, B B Egorov, E I Il'ina, and M A Cherepakhin (Institut Biologicheskikh Problem, Moscow, USSR) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973) Acta Astronautica*, vol 2, Mar -Apr 1975, p 241-246 Translation

In a 45-day experiment, test subjects were exposed to bed rest with their heads down at -4 deg Twice a day their stomach, back, femur, and shin muscles were stimulated with electric current for 25 to 30 min The value of muscle tension was close to the maximum voluntary contraction The main objective was to prevent muscle atrophy and to maintain their trophic and functional states Physiological measurements were carried out together with morphological, cytochemical, and biometric evaluations The tissue removed during biopsy from M soleus 7 days before the test and on the 30th hypokinetic day was used as substrate Electrostimulation favorably affected the tone and strength of muscles as well as their static and dynamic endurance Morphological studies showed a positive effect of electrostimulation on the muscle tissue, preventing the development of atrophic processes Orthostatic tolerance increased during the first post-hypokinetic day (Author)

A75-36334 The biological effectiveness of HZE-particles of cosmic radiation studied in the Apollo 16 and 17 Biostack experiments H Bucker (Frankfurt, Universitat, Frankfurt am Main, West Germany) and G Horneck (Frankfurt, Universitat, Arbeitsgruppe fur biophysikalische Weltraumforschung, Frankfurt am Main, West Germany) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973.) Acta Astronautica*, vol 2, Mar -Apr 1975, p 247-264 19 refs

The Biostack I and II experiments, undertaken to determine the fluence and spectra of high-energy particles in spacecraft and to ascertain their biological affects, are described The degree of damage depended on whether the hit cell was replaceable or not A cosmic radiation dose of up to 500 or more times that on atmosphere-protected earth, present in spacecraft, could have severe effects on man, especially in conjunction with weightlessness S J M

A75-36335 * Skylab experiment M-092 - Results of the first manned mission R L Johnson, G W Hoffler, A Nicogossian, and S A Bergman, Jr (NASA, Johnson Space Center, Houston, Tex) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973) Acta Astronautica*, vol 2, Mar -Apr 1975, p 265-296 9 refs

Blood pressure, heart rate, and percentage increase in leg volume were continuously recorded for the Inflight Lower Body Negative Pressure (LBNP) experiment conducted during the first manned Skylab mission Data were collected over a 5-month preflight period as well as at approximately 3-day intervals throughout the mission Individual variations in cardiovascular responses to LBNP during the preflight period continued to be demonstrated inflight, and measurements of the calf showed that a large volume of fluid was shifted out of the legs early in the flight A much greater increase in leg volume occurred during inflight LBNP than in preflight tests Resting heart rates tended to be low early in the flight and to increase slightly as it progressed, while resting blood pressure varied The LBNP protocol was a greater stress inflight, and the tests had to be stopped early on three occasions due to impending syncopal reactions Inflight LBNP responses seemed to predict the degree of postflight orthostatic intolerance Postflight responses to LBNP during the first 48 hours were characterized by marked elevations in heart rate, instability in blood pressure, and considerably elevated systolic and diastolic pressures both at rest and during stress F G M

A75-36336 * Mineral and nitrogen balance study - Results of metabolic observations on Skylab II 28-day orbital mission G D Whedon, L Lutwak, J Reid, P Rambaut, M Whittle, M Smith, and C Leach (NIH, National Institute of Arthritis, Metabolism, and Digestive Diseases, Bethesda, Md , California, University, U S. Veterans Administration Hospital, Sepulveda, Calif , NASA, Johnson Space Center, Houston, Tex) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973) Acta Astronautica*, vol 2, Mar -Apr 1975, p 297-309 5 refs

The prediction that various stresses of flight, particularly weightlessness, would bring about significant derangements in the metabolism of the musculoskeletal system has been based on various balance-study observations of long-term immobilized or inactive bed rest The three astronauts of Skylab II consumed a planned dietary intake of major metabolic elements in mixed foods and beverages and provided virtually complete collections of excreta for 31 days preflight, 28 days inflight, and 17 days postflight Analyses showed that, in varying degree among the crewmen, urinary calcium increased gradually during flight in a pattern similar to that observed in bed-rest studies Fecal calcium excretion did not change significantly, but calcium balance, owing to the urinary calcium rise, became either negative or less positive than in preflight measurement Increased excretion and negative nitrogen and phosphorus balances inflight indicated appreciable loss of muscle tissue in all three crewmen Significant losses also occurred inflight in potassium, sodium, and magnesium Based on the similarity in pattern and degree between these observations of calcium, phosphorus, and nitrogen loss, musculoskeletal integrity would not be threatened in space flights of up to at least 3 months However, if similar changes occur in the planned Skylab flights for considerably more than 28 days, concern for capable musculoskeletal function should be serious for flights of very many months' duration (Author)

A75-36337 * Postmission plasma volume and red-cell mass changes in the crews of the first two Skylab missions P C Johnson, S L Kimzey, and T B Driscoll (Baylor College of Medicine, Methodist Hospital, NASA, Johnson Space Center, Cellular Analysis Laboratory, Houston, Tex) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973) Acta Astronautica*, vol 2, Mar -Apr 1975, p 311 317 12 refs

Red-cell mass determinations were performed before and after the first two Skylab missions The data showed a 14% mean decrease in red cell mass after the 28-day mission and a 12% mean decrease

after the 59-day mission The red-cell mass returned to premission levels more slowly after the shorter (28-day) than after the longer mission Plasma volume decreases were found after each mission, with the crew from the longer mission showing the greater change (13% vs 8 4%) Postmission decreases in red-cell mass and plasma volume have been a general finding in crewmen who return from short or long spaceflight (Author)

A75-36338 * The Skylab sleep monitoring experiment - Methodology and initial results J D Frost, Jr , M R DeLucchi (NASA, Johnson Space Center, Baylor College of Medicine, Methodist Hospital, Houston, Tex), W H Shumate, and C R Booher (NASA, Johnson Space Center, Houston, Tex) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C , Nov 27-30, 1973) Acta Astronautica,* vol 2, Mar Apr 1975, p 319-336 10 refs Contract No NAS9-12974

The sleep monitoring experiment permitted an objective evaluation of sleep characteristics during the first two manned Skylab flights Hardware located onboard the spacecraft accomplished data acquisition, analysis, and preservation, thereby permitting near-real-time evaluation of sleep during the flights and more detailed postmission analysis The crewman studied during the 28-Day Mission showed some decrease in total sleep time and an increase in the percentage of Stage 4 sleep, while the subject in the 59-Day Mission exhibited little change in total sleep time and a small decrease in Stage 4 and REM sleep Some disruption of sleep characteristics was seen in the final days of both missions, and both subjects exhibited decreases in REM-onset latency in the immediate postflight period The relatively minor changes seen were not of the type nor magnitude which might be expected to be associated with significant degradation of performance capability (Author)

A75-36339 * Skylab task and work performance /Experiment M-151 - Time and motion study/ J F Kubis (Fordham University, New York, N Y) and E J McLaughlin (Fordham University, New York, N Y , NASA, Office of Life Sciences, Washington, D C) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C , Nov 27-30, 1973) Acta Astronautica,* vol 2, Mar -Apr 1975, p 337 349

The primary objective of Experiment M151 was to study the inflight adaptation of Skylab crewmen to a variety of task situations involving different types of activity A parallel objective was to examine astronaut inflight performance for any behavioral stress effects associated with the working and living conditions of the Skylab environment Training data provided the basis for comparison of preflight and inflight performance Efficiency was evaluated through the adaptation function, namely, the relation of performance time over task trials The results indicate that the initial changeover from preflight to inflight was accompanied by a substantial increase in performance time for most work and task activities Equally important was the finding that crewmen adjusted rapidly to the weightless environment and became proficient in developing techniques with which to optimize task performance By the end of the second inflight trial, most of the activities were performed almost as efficiently as on the last preflight trial The analysis demonstrated the sensitivity of the adaptation function to differences in task and hardware configurations The function was found to be more regular and less variable inflight than preflight Translation and control of masses were accomplished easily and efficiently through the rapid development of the arms and legs as subtle guidance and restraint systems (Author)

A75-36340 * Skylab experiment M-171 'Metabolic Activity' - Results of the first manned mission E L Michel (NASA, Johnson Space Center, Biomedical Research Div , Houston, Tex), J A Rummel, and C F Sawin (NASA, Johnson Space Center, Environmental Physiology Branch, Houston, Tex) *(International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C , Nov 27-30, 1973) Acta Astronautica,* vol 2, Mar -Apr 1975, p 351-365 9 refs

The experiment was performed to ascertain whether man's ability to perform mechanical work would be altered as a result of exposure to the weightless environment Skylab II crewmen were exercised on a bicycle ergometer at loads approximating 25%, 50%, and 75% of their maximum oxygen uptake while their physiological responses were monitored The results of these tests indicate that the crewmen had no significant decrement in their response to exercise during their exposure to zero gravity Immediately postflight, however, all crewmen demonstrated an inability to perform the programmed exercise with the same metabolic effectiveness as they did both preflight and inflight The most significant changes were elevated heart rates for the same work load and oxygen consumption (decreased oxygen pulse), decreased stroke volume, and decreased cardiac output at the same oxygen consumption level It is apparent that the changes occurred inflight, but did not manifest themselves until the crewmen attempted to readapt to the 1-G environment (Author)

A75-36358 Perceived distance and the perceived speed of self-motion - Linear vs angular velocity E R Wist, H C Diener, J Dichgans, and T Brandt (Neurologische Universitatsklinik, Freiburg im Breisgau, West Germany) *Perception and Psychophysics,* vol 17, no 6, June 1975, p 549-554 18 refs Research supported by the Alexander von Humboldt Foundation and Deutsche Forschungsgemeinschaft

Experiments are reported in which it was found that, with the angular speed of a visual surround held constant, the perceived speed of rotary self-motion increased linearly with increasing perceived distance of this surround This finding was in agreement with a motion constancy equation derived from a consideration of object-referred motion perception Since information concerning distance is necessary for the perception of linear but not angular speed, this finding supports the conclusion that visually perceived rotary self-motion perception is dependent upon perceived linear surround motion at least in the horizontal plane The visual motion constancy mechanism which operates for object referred motion can apparently not be switched off for the special case of self-motion perception (Author)

A75-36359 Fragmentation of fixated line stimuli as a function of gravitational orientation S R Ellis (McGill University, Montreal, Canada) *Perception and Psychophysics,* vol 17, no 6, June 1975, p 601-606 43 refs National Research Council Grant No A-7891

The differential propensity of fixated line stimuli to fragment and disappear from view was studied as a function of the gravitational orientation of the stimuli The propensity to fragment was measured in terms of three intercorrelated dependent variables the number of fragmentations per fixation period, the total duration of fragmentation per fixation period, and the latency to the first fragmentation Unlike some anisotropic visual phenomena, which may reflect orientation independent aspects of pattern perception, the observed anisotropy of propensity to fragment can be attributed overwhelmingly to the retinal orientation of the stimuli Accordingly, this property of fragmentation need not be ascribed to higher order aspects of pattern perception (Author)

A75-36391 # Individual features in the reaction to hypoxia (Risi individual'nosti v reaktsii na gipoksiiu) V Ia Berezovs'kii (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologichnii Zhurnal,* vol 21, May-June 1975, p 371-376 11 refs In Ukrainian

In individual study of 220 albino rats under the vacuum bell with rarefaction equivalent to an altitude of 12,000 m, survival time (ST) of the individuals varies within a more than 10-fold limit By means of the repeated tests with month interval, animals were selected which manifest a high stability to hypoxia (HSH) It is shown that the relation of ST to time of restitution for the HSH animals is 1 2-1 5, whereas for those low stable to hypoxia (LSH) it does not exceed 0 5 Under conditions of growing hypoxic hypoxia

the HSH and LSH animals manifest different changes in external respiration and rhythm of heart beating The reason for the changed sensitivity of certain individuals to hypoxia may be a phenomenon of a partial genetic blockage which determines peculiarities in the energetic processes in cells at low partial pressure of oxygen
(Author)

A75-36392 # **Changes in the field of peripheral vision under conditions of high mountain climbing (Zmina polia periferichnogo zoru v umovakh visokogirnogo pidiomu)** L R Osipov *Fiziologichnii Zhurnal*, vol 21, May June 1975, p 407-409 14 refs In Ukrainian

The field of peripheral vision of 32 young men was studied at an initial height of 710 m, at 3700 m, and at 5043 m (at the top of the Kazbek mountain) Each man carried a load of 17 to 20 kg The ascent was accomplished, without preliminary training, in the course of three days At a height of 3700 m, the field of vision of left eye narrowed down by 6 9%, and that of the right eye, by 10 4% The changes are attributed to an increase in the vascular tonus of the retina V P

A75-36522 **Resonant electromagnetic power deposition in man and animals** O P Gandhi (Utah, University, Salt Lake City, Utah) In Microwaves in service to man, International Microwave Symposium, Palo Alto, Calif , May 12-14, 1975, Digest of Technical Papers New York, Institute of Electrical and Electronics Engineers, Inc , 1975, p. 282-284 8 refs Grant No DAMD17-74-C-4092.

Experiments are reported showing that strongest power absorption by biological bodies occurs for waves with electric field polarized parallel to the long dimension of the bodies It is also shown that maximum absorption correlates with wavelengths one-quarter as long as the lengths of the bodies Thus, for adult humans, highest whole-body absorption is anticipated at 40-55 MHz. S.J M

A75-36523 **Complex permittivity and penetration depth of certain biological tissue between 40 and 90 GHz** J Edrich and P C Hardee (Denver, University, Denver, Colo) In Microwaves in service to man, International Microwave Symposium, Palo Alto, Calif , May 12-14, 1975, Digest of Technical Papers New York, Institute of Electrical and Electronics Engineers, Inc , 1975, p 288-290 9 refs

Preliminary results of experiments on millimeter-wave irradiation of human body tissue are reported, showing that penetration does not occur to any significant depth below the tissue surface Significant variations in tissue properties vis a-vis radiation were observed after death when compared to life Measurements were performed over the 40-54 and 85 90 GHz frequency ranges S J M

A75-36710 **A new formula for estimating oxygen consumption in man and animal** L A Wennberg (Forsvarets Forsknings anstalt, Sundbyberg, Sweden) *European Journal of Applied Physiology*, vol 34, no 2, 1975, p 65 68 10 refs Research supported by the Styrelsen for Teknisk Utveckling

A formula for estimating the oxygen consumption in man and animals is derived using an outlet volume flow and the oxygen fraction of CO2-free outlet air The formula is simplified and the induced error is evaluated Two applications are discussed (Author)

A75-36711 **Effects of fatiguing isometric exercise upon Achilles tendon reflex and plantar flexion reaction time components in man** K C Hayes (Waterloo, University, Waterloo, Ontario, Canada) *European Journal of Applied Physiology*, vol 34, no 2, 1975, p 69-79 27 refs

A75-36712 **Influence of bicycle ergometer work and oral glucose administration on the human muscle-hexokinase activity (Der Einfluss von Fahrradergometerarbeit und oraler Glucose-Gabe auf die Muskel-Hexokinase-Aktivitat des Menschen)** G Hoffmann, Ch Scheder, B Holzmuller, and W Muller-Limmroth (Munchen, Technische Universitat, Munich, West Germany) *European Journal of Applied Physiology*, vol 34, no 2, 1975, p 91 96 15 refs In German

A75 36713 **Venous and capillary blood hematocrit at rest and following submaximal exercise** T D Fahey and R Rolph (San Jose State University, San Jose, Calif) *European Journal of Applied Physiology*, vol 34, no 2, 1975, p 109-112 13 refs

A75-36714 **Assessment of aerobic and anaerobic capacity of athletes in treadmill running tests** N I Volkov, E A Shirkovets, and V E Borilkevich (Central State Institute of Physical Culture, Moscow, USSR) *European Journal of Applied Physiology*, vol 34, no 2, 1975, p 121-130 26 refs

Experiments are reported in which excess CO2 release (exc CO2) was measured during treadmill testing and compared with simultaneous max V-O2 measurements From the values of exc CO2 recorded in an increasing running speed test, the threshold of aerobic metabolism (V-TAM) was easily determined The investigation was designed to assess indices of power, capacity and efficiency of both aerobic and anaerobic metabolism Exc CO2 achieves these ends and is easy to determine, as it does not require blood sampling and can be carried out concurrently with measurement of O2 consumption S J M

A75-36725 # **Consequence of social isolation on blood pressure, cardiovascular reactivity and design in spontaneously hypertensive rats** M Hallback (Goteborg, University, Goteborg, Sweden) *Acta Physiologica Scandinavica*, vol 93, Apr 1975, p 455-465 28 refs Research supported by the Swedish National Association Against Heart and Chest Disease and University of Goteborg, Swedish Medical Research Council Grant No B74-14X-16-10C

A75-36836 * **Geometry of aortic heart valves** H M Karara (Illinois, University, Urbana, Ill) In American Society of Photogrammetry, Annual Meeting, 41st, Washington, D C , March 9-14, 1975, Proceedings Falls Church, Va , American Society of Photogrammetry, 1975, p 718-735 Contract No NAS9-12459

Photogrammetric measurements of the surface topography of the aortic valves obtained from silicon rubber molds of freshly excised human aortic valves are presented The data are part of an investigation into the design of a new prosthetic valve which will be a central flow device, like the real valve and unlike previous central occluding prostheses Since the maximum stress on the heart valve is induced when the valve is closed and subject to diastolic back-pressure, it was decided to determine the valve geometry during diastole That is, the molds were formed by pouring the rubber down the excised aortas, causing the valves to close The molds were made under different pressures (20 120 torr), photogrammetry served as a vehicle for the assessment of the mold topography through the following outputs digital models, surface profiles, and contour maps S J M

A75-36993 **Methods of electronic simulation of flight sounds (Methoden der elektronischen Fluggerauschsimulation)** K Hillmann and K -P Gartner (Forschungsinstitut fur Anthropotechnik, Meckenheim, West Germany) *Zeitschrift fur Flugwissenschaften*, vol 23, June 1975, p 203-209 8 refs In German

An overview of methods for electronically synthesizing sounds is presented A given amount of hardware and computer capacity places an upper limit on the degree and fidelity of realism which is attainable Good sound realism for aircraft simulators can be especially expensive because of the complexity of flight sounds and their changing patterns with time Nevertheless, a flight simulator shows that it is possible to design an inexpensive sound simulator with the required acoustic properties using analog computer

elements The characteristics of the infrasound elements produced by this sound simulator for take-off, cruise, and approach are discussed (Author)

A75-37000 **Possible mechanisms of corona discharge involved in biogenesis** J Latham (University of Manchester Institute of Science and Technology, Manchester, England) *Nature*, vol 256, July 3, 1975, p 34, 35 5 refs

A brief description is presented of experiments which demonstrate how corona discharges involved in biogenesis can be produced at or near the ocean surface It is noted that electric discharges can synthesize amino acids and other organic compounds under conditions simulating the atmosphere of the primitive earth, and that corona discharges in the vicinity of an ocean surface can result from drop splashing, bubble bursting, and raindrop collisions in the presence of strong electric fields associated with thunderclouds The described experiments show that corona discharges can occur when bubbles burst at a water surface in fields with values of at least 260 kV/m F G M

A75-37024 **Dynamic properties of eye position coded neurons in the alert monkey during saccades** R Eckmiller (California, University, Berkeley, Calif , Berlin, Freie Universitat, Berlin, West Germany) *Pflugers Archiv*, vol 357, no 3-4, 1975, p 253-265 29 refs Research supported by the Deutsche Forschungsgemeinschaft, Grant No PHS-EY-00592

A75-37025 **Investigation on the possible role of a work factor in thermoregulatory behavior of man** M Scarperi, K Behling, and A Bleichert (Hamburg, Universitat, Hamburg, West Germany) *Pflugers Archiv*, vol 357, no 3-4, 1975, p 267 273 9 refs

A75-37047 # **Comments on the work of an airliner crew (Uwagi o pracy zalogi samolotu komunikacyjnego)** T Buczylko *Technika Lotnicza i Astronautyczna*, vol 30, June 1975, p 11-14 9 refs In Polish

The ergonomic aspects of the work of airliner crews are discussed, with particular reference to the adaptation of aircraft systems to the human operator An attempt is made to model the decision making by the pilot on the basis of prescribed criteria and of the flow of information from ATC and onboard instruments V P

A75-37072 **Role of histamine in the hypoxic vascular response of the lung** C A Hales (Massachusetts General Hospital, Boston, Mass) and H Kazemi (Harvard University, Boston, Mass) *Respiration Physiology*, vol 24, June 1975, p 81 88 20 refs Grants No NIH-HL 06664, No NIH-HL 05767

Studies were undertaken to determine the contribution of histamine to the localized pulmonary vasoconstrictor response to hypoxia One lung in each of several anesthetized dogs was ventilated with nitrogen, after 10 minutes, perfusion (Q) to the lung was decreased by 32% When chlorpheniramine maleate, a potent antihistamine, was intravenously infused, no change in Q was observed Therefore, no significant role was demonstrated for histamine in the regional lung vascular response to hypoxia in the absence of systemic hypoxemia S J M

A75-37139 **Effects of motion on the parameters of the human operator engaged in a roll axis tracking task** J A Neff and A M Junker (USAF, Aerospace Medical Research Laboratories, Wright Patterson AFB, Ohio) In Conference on Decision and Control, 5th and Symposium on Adaptive Processes, 13th, Phoenix, Ariz , November 20-22, 1974, Proceedings New York, Institute of Electrical and Electronics Engineers, Inc , 1974, p 167, 168

A multiple-input single-output linear state variable model is used to determine the extent to which a human controller involved in a compensatory tracking task uses cues other than the visual error signal to improve his tracking performance The control system used in this study is a roll axis chair designed to simulate roll in a high performance aircraft The additional cues studied are the angular position and angular velocity of the human controller (Author)

A75-37148 * **Environment-sensitive manipulator control** A K Bejczy (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif) In Conference on Decision and Control, 5th and Symposium on Adaptive Processes, 13th, Phoenix, Ariz , November 20-22, 1974, Proceedings New York, Institute of Electrical and Electronics Engineers, Inc , 1974, p 633-645 39 refs Contract No NAS7-100

Environment-sensitive manipulator control (control systems capable of controlling manipulator motion based on real time response to sensor data obtained during the attempt to perform a requested task) is described, and experiments on (1) proximity control in manipulation and (2) application of an articulated and adaptively controlled hand-to-environment-sensitive manipulator control are reported The efficiency of such systems is determined by the separation of control and data processing functions between operator and computer S J M

A75 37149 **A pulse-width modulated model for visual eye tracking** M R Clark, A T Bahill, and L Stark (California, University, Berkeley, Calif) In Conference on Decision and Control, 5th and Symposium on Adaptive Processes, 13th, Phoenix, Ariz , November 20 22, 1974, Proceedings New York, Institute of Electrical and Electronics Engineers, Inc , 1974, p 655-657 8 refs

The saccadic eye movement system is an important neurological feedback control system contributing to crucial visual information processing and decision operations in man and animals Careful modelling of the extraocular muscles and eyeball plant as well as the reciprocal innervation controller signal patterns have enabled us to demonstrate the time optimal nature of the saccadic movement trajectory We here propose a pulse width modulation process for generating these time optimal saccades and present supporting experimental and modelling results (Author)

A75-37171 * **Time estimates in a long-term time-free environment** P Lavie and W B Webb (Florida, University, Gainesville, Fla) *American Journal of Psychology*, vol 88, June 1975, p 177-186 9 refs Grant No NGR-10 005-057

Subjects in a time-free environment for 14 days estimated the hour and day several times a day Half of the subjects were under a heavy exercise regime During the waking hours, the no-exercise group showed no difference between estimated and real time, whereas the exercise group showed significantly shorter estimated than real time Neither group showed a difference after the sleeping periods However, the mean accumulated error for the two groups was 48 73 hours and was strongly related to the displacements of sleep/waking behavior It is concluded that behavioral cues are the primary determinants of time estimates in time-free environments (Author)

A75-37250 **A bibliography of published information on combustion toxicology** C J Hilado and C L Shabdue (West Virginia Institute of Technology, Montgomery, W Va) *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, May 1975, p 168-174 77 refs

A75-37326 * **A mathematical analysis of the mortality kinetics of Drosophila melanogaster exposed to gamma radiation.** C B Dolkas, H Atlan, G Dolkas, and J Miquel (NASA, Ames Research Center, Moffett Field, California, University, Berkeley, Calif) *Mechanisms of Ageing and Development*, vol 4, 1975, p 59-69 8 refs

A75-37327 * Effects of oxygen-nitrogen /1 1/ at 760 Torr on the life span and fine structure of Drosophila melanogaster. J Miquel, P R Lundgren, and K G. Bensch (NASA, Ames Research Center, Moffett Field, Stanford University, Stanford, Calif.) *Mechanics of Ageing and Development*, vol 4, 1975, p 41-57 42 refs

A75-37386 Advances in clinical vectorcardiography A Benchimol and K B Desser (Good Samaritan Hospital, Phoenix, Ariz) *American Journal of Cardiology*, vol 36, July 1975, p 76-87 72 refs Research supported by the Nichols and Sigsworth Memorial Funds

Experiments are reported that demonstrate the clinical superiority of the vectorcardiogram over the conventional 12 lead scalar electrocardiogram Vectorcardiograms were taken along with performance of complete right and left heart catheterization and selective coronary cineangiography in 5,000 patients Disorders observed included atrial and ventricular hypertrophy, coronary artery disease and myocardial infarction, conduction abnormalities, and cardiac arrhythmias S J M

A75-37387 Left ventricular volume measurement by echocardiography - Fact or fiction J W Linhart, G S Mintz, B L Segal, N Kawai, and M N Kotler (Chicago Medical School, Chicago, Ill , Hahnemann Medical College and Hospital, Philadelphia, Pa). *American Journal of Cardiology*, vol 36, July 1975, p 114-118 11 refs

A critical evaluation of echocardiographic measurement of left ventricular volume is presented Errors in measuring minor axis, in measuring distance, and in translating minor axis dimension into volume determination are discussed, along with correlation of echocardiographic with angiographic measurements and the clinical status of echocardiography It is concluded that the method is not adequate as a means of absolute measurement, but that it has value in relative measurements over time in the same patient S J M

A75-37436 On estimating and reducing the effect of intersubject EEG variation on the performance of EEG pattern recognition systems J A McEwen (British Columbia, University, Vancouver, Canada) In Hawaii International Conference on System Sciences, 8th, Honolulu, Hawaii, January 7-9, 1975, Proceedings North Hollywood, Calif , Western Periodicals Co , 1975, p 158-160 6 refs

Recent attempts have been made to develop electroencephalographic (EEG) pattern recognition systems for a variety of diagnostic and monitoring applications However, intersubject EEG variation has proven to be a major source of difficulty in the development of reliable EEG pattern recognition systems Several aspects of the problem of estimating and reducing the effect of intersubject EEG variation are discussed with reference to a specific EEG pattern recognition system (Author)

A75-37487 Human factors in safe flight operations, Proceedings of the Twenty-seventh Annual International Air Safety Seminar, Williamsburg, Va., November 10-14, 1974 Seminar sponsored by the Flight Safety Foundation Arlington, Va , Flight Safety Foundation, Inc , 1974 269 p $20

Passenger and crew behavioral factors involved in flight accidents and fatalities, and causes of that behavior, are discussed Emphasis is on the need for future research in this area. Fields explored include training simulators, pilot problems in low-visibility approach and landing, selected medical problems in the field of human factors or ergonomics, professional ground handling, life changes and aviation accidents, workload reduction on the flight deck, passenger behavior in emergencies, and passenger escape from commercial aircraft

S J M.

A75-37488 Incremental transfer and cost effectiveness of flight training simulators. S N Roscoe (Illinois, University, Urbana, Ill) In Human factors in safe flight operations, Proceedings of the Twenty-seventh Annual International Air Safety Seminar, Williamsburg, Va , November 10-14, 1974 Arlington, Va , Flight Safety Foundation, Inc , 1974, p 51-60

The cost-effectiveness of flight training simulators is discussed as it relates to procedural fidelity and training objectives The law of diminishing returns on simulator transfer effectiveness is described, if a simulator costs almost as much as its counterpart airplane, then when an hour of simulator time saves less than an hour of flight training time, the simulator will cease to be cost-effective Moreover, recent studies have shown that simulators without moving cockpits are more transfer-effective in training pilots for aircraft than are ones with moving cockpits Procedural fidelity, involving easily forgotten cognitive skills, is deemed more important than perceptual-motor fidelity, and more difficult to achieve S J M

A75-37490 Selected medical problems in the field of human factors or ergonomics R A McFarland (Harvard University, Cambridge, Mass) In Human factors in safe flight operations, Proceedings of the Twenty-seventh Annual International Air Safety Seminar, Williamsburg, Va , November 10 14, 1974 Arlington, Va , Flight Safety Foundation, Inc , 1974, p 83 99 25 refs

Selected illustrations of human factors research, ergonomic developments in the field of highway safety, the influence of aging on pilot performance and safety, and the need for developing airport medical programs are discussed Specific topics treated include early developments in air transportation, private flying and neglected areas of study, new design features in automobiles, the role of the drinking driver, medical conditions and accidents among drivers, the changing nature of the age composition in our population, age distributions of airline pilots, and medical services needed for passengers and airport employees S J M

A75-37492 * Human error in aviation operations C E Billings, J K Lanber, and G E Cooper (NASA, Ames Research Center, Moffett Field, Calif) In Human factors in safe flight operations, Proceedings of the Twenty seventh Annual International Air Safety Seminar, Williamsburg, Va , November 10-14, 1974 Arlington, Va , Flight Safety Foundation, Inc , 1974, p 181-183

This report is a brief description of research being undertaken by the National Aeronautics and Space Administration The project is designed to seek out factors in the aviation system which contribute to human error, and to search for ways of minimizing the potential threat posed by these factors The philosophy and assumptions underlying the study are discussed, together with an outline of the research plan (Author)

A75-37493 Life changes and aviation accidents R A Alkov (U S Naval Safety Center, Norfolk, Va) In Human factors in safe flight operations, Proceedings of the Twenty-seventh Annual International Air Safety Seminar, Williamsburg, Va , November 10-14, 1974 Arlington, Va , Flight Safety Foundation, Inc , 1974, p 185-189 5 refs

Qualitative data are discussed which indicate that an increased frequency of favorable or unfavorable changes in an ongoing lifestyle is often connected with an aircraft accident Such a correlation is especially strong in the case of the accident-prone personality This person is adventurous, impulsive, and hard on himself, when personal changes begin to accumulate, he feels he is losing control and becomes depressed The depression lowers his mental and physical reactivity, but he continues to fly to the limits of his personal envelope, which is often demanding because he is a high achiever Eventually a mistake is made, and a mishap results S J M

A75-37494 Workload reduction on the flight deck J LeRoy (Air Line Pilots Association, International, Washington, D C) In Human factors in safe flight operations, Proceedings of the Twenty-seventh Annual International Air Safety Seminar,

Williamsburg, Va , November 10-14, 1974
Arlington, Va , Flight Safety Foundation, Inc , 1974, p 205-226 11 refs

Workload, crew capacity, and accident occurrence are discussed as they relate to each other Data concerning the DC-9 and the B-727 are compared, and the three-man crew of the B-727 is found to have a 50-100% greater capacity than the two-man crew of the DC-9 A more even distribution of critical tasks among three-member crews is recommended, so that cognitive and decision-making capability can be preserved for the captain S J M

A75-37618 Adaptive pattern processing in the visual system A Trehub (U S Veterans Administration Hospital, Northampton, Mass) *International Journal of Man-Machine Studies,* vol 7, May 1975, p 439-446 8 refs

Proposed is a neuronal network capable of learning pattern discrimination Basic characteristics of the component neurons largely reflect well-established physiological principles and their individual plastic properties are consistent with recent findings concerning visual experience and synaptic changes detected by electron-microscopy Pattern discrimination within the network is robust under rather severe input-pattern degradation (Author)

A75-37620 Influence of receptor-receptor fibres on the spontaneous afferent activity from semicircular canals in the frog /Rana esculenta/ J Caston and A Gribenski (Rouen, Universite, Mont-Saint-Aignan, Seine-Maritime, France) *Pflugers Archiv,* vol 358, no 1, 1975, p 81 88 13 refs

A75-37691 Color coding for air traffic control displays R J Cahoon (United Aircraft Corp , Norden Div , Norwalk, Conn) In NAECON '75, Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, June 10-12, 1975 New York, Institute of Electrical and Electronics Engineers, Inc , 1975, p 537-540

This paper discusses the use of color in air traffic control displays Various methods of color coding to enhance and declutter the air traffic display are presented, together with results of evaluation of human performance using color and monochrome displays Particular emphasis is placed on the current state of the art of color cathode ray tubes Special circuit design considerations for the voltage penetration CRT are presented, including switching high voltage power supplies, deflection and focus correction circuits, and video amplifiers Additional topics are projected development in color CRT display and multipersistence voltage penetration CRTs for simultaneous display of radar and computer graphics Photographs of high density color and radar displays ro air traffic control will be discussed (Author)

A75-37692 Advanced speech technology applied to problems of air traffic control M W Grady (Logicon, Inc , San Pedro, Calif) and M B Herscher (Threshold Technology, Inc , Cinnaminson, N J) In NAECON '75, Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, June 10 12, 1975 New York, Institute of Electrical and Electronics Engineers, Inc , 1975, p 541 546

Speech, since it is a natural means of communicating, offers significant advantages as a means of man/machine interface Techniques currently exist for enabling the computer to understand spoken commands, as well as for computer generation of speech This paper describes application of these techniques to the problems of air traffic control in (1) training applications and (2) the operational environment For training, a system currently used to train Ground Controlled Approach (GCA) controllers, developed for and in conjunction with NTEC, is described A combined speech recognition and synthesizing system for application to the operational environment is also described (Author)

A75-37693 Computer-generated voice in air traffic control applications A F Beck and D E Anderson (Sperry Rand Corp , Sperry Univac Div , Blue Bell, Pa) In NAECON '75, Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, June 10-12, 1975 New York, Institute of Electrical and Electronics Engineers, Inc , 1975, p 547-551 14 refs

Many automated functions that are to be added to the National Airspace System (NAS) could benefit from the addition of computer-generated voice In fact, some may require its addition to ensure that controller voice communications workloads do not become excessive This paper describes several future air traffic control automation functions that are likely to be added to the NAS and the benefit that could be derived from adding computer-generated voice to these functions In addition, it provides a summary review of computer-generated voice techniques, the rationale for the selection of a technique (digitally encoded prerecorded voice), and a description of two experimental computer-generated voice systems used in the air traffic control environment (Author)

A75-37913 # Discrete time modelization of human pilot behavior D Cavalli and D Soulatges (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France) *(NASA, Annual Conference on Manual Control, 11th, NASA Ames Research Center, Moffett Field, Calif , May 21-23, 1975) ONERA, TP* no 1975-52, 1975 12 p

Pilot behavior was observed using an electrooculometer and a simulated lunar module cockpit, and the behavior was modeled assuming that only one task can be performed at a time and that the pilot's operating mode depends on the flight subphase considered Two strategies are applied to the numerical analysis a Markovian strategy and a heuristic strategy Results may be useful in the design of an automated piloting system S J M

A75-38004 The effect of stimulus orientation on the visual evoked potential in human subjects S Yoshida, S Iwahara, and N Nagamura (Tokyo University of Education, Industrial Products Research Institute, Tokyo, Japan) *Electroencephalography and Clinical Neurophysiology,* vol 39, July 1975, p 53-57 18 refs

The article investigates the orientational effect observed in terms of amplitude, latency and variability of the average evoked potential (AEP) produced by stationary grating of high dark-bright contrast The method and materials used in the experiment are discussed in detail The occipital EEG and the horizontal and vertical EOG of the four male subjects were recorded during the experiments Resulting data are analyzed It was concluded that the AEP was less in amplitude when it was presented obliquely than when it was oriented horizontally or vertically, and the amplitude was more variable for the oblique orientation No orientational effect was observed upon the AEP latency M G

A75-38031 # The feasibility of dermatologic consultation to remote areas via 2-way color satellite transmission G F Odland and E A Zinser (Washington, University, Seattle, Wash) *American Institute of Aeronautics and Astronautics, Conference on Communication Satellites for Health/Education Applications, Denver, Colo , July 21-23, 1975, Paper 75-896* 6 p

A75-38046 * VECTAN II - A computer program for the spatial analysis of the vectorcardiogram D P Golden, Jr , G W Hoffler, R L Johnson (NASA, Johnson Space Center, Cardiovascular Laboratory, Houston, Tex), and R A Wolthuis *Journal of Electrocardiology,* vol 8, July 1975, p 217-225 14 refs Contracts No NAS9-11785, No NAS9-13291

This paper presents the operation of a digital computer program, VECTAN II, for the spatial analysis of the vectorcardiogram (VCG)

The program incorporates a unique waveform recognition algorithm based on the spatial vector length which has been shown to perform better than previous algorithms The waveform analysis employed by the program considers the vectorcardiogram as a three dimensional entity rather than as scalar or planar representations VECTAN II is designed chiefly to measure and quantify the VCG response of normal subjects to a controlled stress by analyzing one VCG complex every five seconds throughout a long experiment The program has been used to analyze data from the NASA Johnson Space Center Cardiovascular Laboratory, from the pre- and postflight medical examinations of the Apollo 15, 16 and 17 crewmen, and from onboard Skylab experiments (Author)

A75-38182 # **Manipulator robots (Roboty-manipuliatory)** E P Popov (Moskovskoe Vysshee Tekhnicheskoe Uchilishche, Moscow, USSR) In Selected problems in applied mechanics Collection of works dedicated to the sixtieth birthday of academician Vladimir Nikolaevich Chelomei Moscow, Izdatel'stvo VINITI, 1974, p 575-582 In Russian

The characteristics of manipulator robots are described, and their application as multipurpose systems in extremal environments where a human operator cannot survive is examined A typical block diagram of a manipulator robot is discussed, along with means of obtaining computer-aided solutions to problems of perfecting such manipulators V P

A75-38300 # **The state of sleep of the winter personnel of a coastal Antarctic station (Sostoianie sna n zimovshchikov pribrezhnoi Antarkticheskoi stantsii)** M M Bogoslovskii *Antarktika*, no 14, 1975, p 197-204 23 refs In Russian

Data concerning the state of sleep were obtained from questionnaires and by recording EEG's, movements during sleep, breathing, etc The mean-annual duration of sleep was 8 hrs The sleep characteristics did not differ during the dark or light times of the year Sleep was most peaceful toward the end of the year, and most restless during the middle of the winter stay EEG studies showed that at the end of the winter stay, there was a decline in the frequency of occurrence and length of paradoxical phase of sleep, and an increase in frequency and length of superficial phase of sleep The data show that polar insomnia can be avoided and that normal sleep can be maintained by adhering to a strict daily routine M G

A75-38379 # **A simulation study of coronary circulation** F Kajiya, H Inada, N Hoki, and T Furukawa (Osaka University, Osaka, Japan) *Osaka University, Technology Reports*, vol 25, Mar 1975, p 91 100 16 refs Research supported by the Monbusho Kagaku-Kenkyuhi

A simulation study is conducted to evaluate the roles of the coronary-luminal pathways (sinusoidal vessels and thebesian veins) and to analyze coronary blood flow patterns In the present model, variable resistances of the intramyocardial portion of coronary vessels are estimated from extravascular pressure and intravascular pressure based on the elastic diagram of each blood vessel Following the simulation study, it is found that flow in the extramyocardial coronary artery is in good agreement with that obtained by an electromagnetic flow meter Coronary venous flow shows two kinds of forward flow patterns in the systolic and the diastolic phase, while the coronary luminal pathway and right atrial pressure influence the configuration of the venous flow These results imply that coronary-luminal pathways play a role in pressure transmission to the intramyocardial coronary vessels and in blood supply to the heart (Author)

A75-38408 **Vocational interests of air traffic control personnel** R C Smith and G L Hutto (FAA, Civil Aeromedical Institute, Oklahoma City, Okla) *Aviation, Space, and Environmental Medicine*, vol 46, July 1975, p 871-877 8 refs

The interest patterns of air traffic controllers were surveyed for the purposes of (1) determining the interests of journeyman controllers, (2) determining the relationship of controller interests to those of other occupational groups, (3) devising an interest scale for air traffic work, and (4) developing a measure for guidance for selection of air traffic specialties (e g , terminal, en route, flight service) A total of 787 male controllers from terminal, en route, and FSS facilities completed the strong vocational interest blank, a measure of interest patterns It was found that none of the existing occupational scales clearly reflected the interest patterns of controllers An air traffic controller scale was devised which distinguished the air traffic controllers from men in general and from men in other occupations There were no substantial differences between the interest patterns for the three options, however, it was found that dissatisfied controllers scored lower on the overall air traffic controller scale than did satisfied controllers (Author)

A75-38409 **Cardiopulmonary effects of combined exercise and +Gz acceleration** S A Nunneley and D S Shindell (New York, State University, Buffalo, N Y) *Aviation, Space, and Environmental Medicine*, vol 46, July 1975, p 878-882 17 refs Contracts No N00014-68-A-0216, No F44620-72 C 0009, Grants No NIH-NL 14414-02, No PHS-5 T01 GM-00341

Experiments were conducted to evaluate the effects of leg exercise on cardiopulmonary function in four men exposed to + 1, + 2, and + 3 Gz at ergometer settings of 0, 300, and 600 kpm/min It was found that acceleration raised resting oxygen uptake, minute volume of expired gas, their ratio, and heart rate, but it lowered oxygen pulse and end tidal CO2 tension At higher workloads, the combination of G with exercise caused a divergence from control measurements Cardiogenic oscillation amplitude increased with G and decreased with work, which indicates that exercise improves the homogeneity of alveolar ventilation/lung perfusion at all G-levels S D

A75-38410 **Arterial and tissue gas tensions in rats during development of pulmonary oxygen poisoning** M Valimaki (Turku, University, Turku, Finland) *Aviation, Space, and Environmental Medicine*, vol 46, July 1975, p 883-886 23 refs Research supported by the Emil Aaltonen Foundation

A75-38411 **Physiologic effects of seatback angles less than 45 deg /from the vertical/ relative to G** R R Burton, P F Iampietro, and S D Leverett, Jr (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine*, vol 46, July 1975, p 887-897 18 refs

Eight experimental subjects and four YF 16/17 test pilots were exposed to a simulated aerial combat maneuver (SACM) which included a maximum G exposure of 6 s at 8 G The following physiologic parameters were examined relative to seatback angles of 23, 28, and 40 deg heart rate and rhythm, arterial oxygen saturation, performance, intrathoracic (esophageal) pressure, arterial pressure, and subject comfort, effort, and fatigue Relaxed and straining high sustained G (HSG) tolerances (6 G for 60 s) were also determined using only experimental subjects The advantages of the 40 deg seatback angle during the SACM included increased subject comfort, less fatigue and effort, greater pilot acceptance and a statistically significant reduction in the increased mean heart rate associated with G exposure On the other hand, a statistically significant reduction in arterial oxygen saturation was obtained during the SACM at 40 deg compared with the 23 deg back angle An increase in relaxed G tolerance was found with the 40 deg seatback angle statistically significant only when compared with the 28 deg seatback angle (Author)

A75-38412 **Effect of hyperbaric helium on vitamin uptake and utilization by micro-organisms** V Frattali and R Robertson (National Naval Medical Center, Naval Medical Research Institute, Bethesda, Md) *Aviation, Space, and Environmental Medicine*, vol 46, July 1975, p 898-901 15 refs Navy Task M4306,02,4080BDK9

Growth responses under hyperbaric helium of various procaryotic microorganisms to graded levels of six water-soluble vitamins were measured Vitamins included thiamin, riboflavin, niacin, pantothenic acid, biotin, and folic acid (folacin) The growth response of each organism under hyperbaric helium was compared with that under 80% He-20% O2 and other He-O2 gas mixtures at atmospheric pressure, and with the response in air at atmospheric pressure For five of the six vitamins, no differences in response were observed The growth response of streptococcus faecalis to growth limiting concentrations of folic acid was depressed during cultivation under He-O2 at 69 ATA It is concluded that the growth response of an organism is repressed by hyperbaric helium as a result of interference with uptake or utilization of this vitamin (Author)

A75-38413 * Effects of prolonged weightlessness on the swimming pattern of fish aboard Skylab 3 R J von Baumgarten, R C Simmonds, J F Boyd, and O K Garriott (NASA, Ames Research Center, Moffett Field, Calif) *Aviation, Space, and Environmental Medicine,* vol 46, July 1975, p 902-906 13 refs

Looping behavior of minnows aboard Skylab 3 is analyzed Extensive looping patterns were observed at first look on the third day of weightlessness, thereafter, the frequency of the looping episodes diminished until complete adaptation on the twenty first day, at which time the fish oriented themselves with their backs to the light The swimming anomaly could be due to (1) absence of continuous bending of sense hairs to a certain extent by gravity, causing the fish to tilt forward in an attempt to increase leverage on the hairs - in the absence of all gravity, tilting is continued into looping (this hypothesis is supported by parabolic flight experiments with partial gravity, in which only tilting was seen), or (2) an attempt by the fish to create a gravitoinertial stimulus by 'centrifuging' its otoliths by looping S J M

A75-38414 Changes in exercise heart rate in lowlanders after prolonged stay at high altitude /4000 m/ J S Gupta, G L Dua, N Srinivasulu, and M S Malhotra (Defence Institute of Physiology and Allied Sciences, Delhi, India) *Aviation, Space, and Environmental Medicine,* vol 46, July 1975, p 907 910 22 refs

Studies were conducted on cardiac frequency during submaximal and maximal work in 26 sea-level residents prior to transfer to and during stay at high altitude for 1, 10, and 20 months Maximal O2 uptake and performance in a 1 6 km run were observed Results indicated a significant drop in V-O2 after arrival at altitude followed by recovery with further stay The mean maximum heart rate decreased to 182 8 beats/min after 1 month at high altitude from a sea level mean value of 188 4 beats/min It increased to 199 2 beats/min and decreased to 185 6 beats/min after 10 and 20 months, respectively Heart rate, during submaximal work requiring 1 0 and 1 5 liters of O2 per min, indicated the highest rate after 1 month at altitude and decreased with prolonged stay, but remained higher than the sea-level value These changes were compared with the high-altitude native residents (Author)

A75-38415 Effects of hypoxia on early pregnancy and embryonic development in the mouse B A Rattner and G M Ramm (Maryland, University, College Park, Md) *Aviation, Space, and Environmental Medicine,* vol 46, July 1975, p 911 915 27 refs Research supported by the University of Maryland and Clay Adams Co

A75-38416 Variations in the activity of some brain and plasma enzymes under the influence of +Gz acceleration S A Cananau, P Groza, A Albu, C T Dragomir, A Petrescu, and B Zaharia (Institute of Medicine and Pharmacy, Bucharest, Rumania) *Aviation, Space, and Environmental Medicine,* vol 46, July 1975, p 916 921 36 refs

The present paper examines the activity of enzymes associated with cytomembranes in the plasma and brain of guinea pigs exposed to repeated + 10 Gz acceleration Immediately after the last run, diminution of enzymatic activity in the brain supernate paralleled a rise in plasma enzymatic activity Variations in enzymatic activity suggested the liberation of enzymes connected with the neuronal organelles, consequent to alterations in the permeability or structure of the neuronal cytomembranes These alterations are interpreted as being accompanied by permeabilization of the blood brain barrier, with release of the enzymes from the neuronal structures into the plasma Changes in the permeability of the neuronal membranes are attributed to several factors cerebral hypoxia following the hemodynamic and ventilation alterations induced by hypergravitation, the influence upon the membrane permeability of hormones released in excess under the stress of acceleration, and the strain to which the central nervous system neurons are subjected by the multitude of afferent impulses from receptors stimulated by hypergravitation (Author)

A75-38417 Rat operant responding - An indicator of nitrogen narcosis. R D Jennings (Portland State University, Portland, Ore) and B Breck *Aviation, Space, and Environmental Medicine,* vol 46, July 1975, p 922 929 19 refs Research supported by the Portland State University

One group of rats was stabilized on a variable ratio (VR) 50 schedule and another on a differential reinforcement of low rate (DRL) 20 s schedule Four subgroups in each were exposed to 1, 7 1, 10 2, or 13 3 ATA for 30 min once a week for 6 weeks with a seventh exposure after a 4-week hiatus At 10 2 and 13 3 ATA, DRL 20-s response rate increased and VR 50 decreased At 13 3 ATA, time spent responding was markedly reduced for the VR 50 animals and less so for the DRL 20-s animals Response rate of the DRL 20-s group varied as a function of weekly exposures to pressure, but not systematically so There was an increase in VR 50 time spent responding on the third dive which continued through the sixth and was lost on the seventh Findings were discussed in terms of the utility of a behavioral preparation for a pharmacological analysis of nitrogen narcosis (Author)

A75-38418 * Prevention of decompression sickness during a simulated space docking mission J P Cooke, R R Bollinger, and B Richardson (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine,* vol 46, July 1975, p 930 933 21 refs NASA Order T 82170

This study has shown that repetitive exchanges between the Apollo space vehicle atmosphere of 100% oxygen at 5 psia (258 torr) and the Soyuz spacecraft atmosphere of 30% oxygen-70% nitrogen at 10 psia (533 torr), as simulated in altitude chambers, will not likely result in any form of decompression sickness This conclusion is based upon the absence of any form of bends in seven crewmen who participated in 11 tests distributed over three 24-h periods During each period, three transfers from the 5 to the 10 psia environments were performed by simulating passage through a docking module which served as an airlock where astronauts and cosmonauts first adapted to each other's cabin gases and pressures before transfer Biochemical tests, subjective fatigue scores, and the complete absence of any form of pain were also indicative that decompression sickness should not be expected if this spacecraft transfer schedule is followed (Author)

A75-38419 Algorithm for the multi-parameter analysis of nystagmus using a digital computer A W Sills, V Honrubia, and W E Kumley (California, University, Los Angeles, Calif) *Aviation, Space, and Environmental Medicine,* vol 46, July 1975, p 934 942 18 refs Grants No NIH-NS-08335, No NIH-NS-09823, No NIH-RR-3

A computer program for analyzing nystagmus has been developed and can be used on a small laboratory digital computer The algorithm accepts digitized data and looks for the minimum and maximum (minmax) points of the nystagmus waveform These points in turn are used to define seven descriptive parameters of nystagmus, including the amplitude, duration, and velocity of the slow and fast phases, and the frequency The algorithm uses three

user-adjusted criteria for accepting or rejecting minmax points The treatment of noisy or irregular data can be improved by adjusting the values of these criteria (Author)

A75-38420 **Use of the ERG and EOG in evaluating the effect of sleep deprivation on visual function in flying personnel** D I Tasker, S G Kinel, and T J Tredici (USAF, School of Aerospace Medicine, Brooks AFB, Tex.) *Aviation, Space, and Environmental Medicine*, vol 46, July 1975, p 943-945 7 refs

The electroretinogram (ERG) and electrooculogram (EOG) are electrophysiological tests employed in ophthalmology to diagnose degeneration or injury to the outer half of the retina, including the rods and cones of the visual system This pilot study was undertaken to determine if sleep deprivation of more than 24 h in rated flying personnel may show an abnormality in retinal function as measured by the ERG and/or EOG This may give insight to the visual function in flying personnel on deployment or other long missions where uninterrupted sleep may be a problem The results of this study showed that some subjects deprived of sleep exhibited a statistically significant variance in their EOG ratios as compared to a nondeprived control group No significant changes in ERG were detected Principles and theory of electrophysiological testing in ophthalmology are presented (Author)

A75-38421 **Amplitude/frequency differences in a single-lead ECG of normal versus coronary heart diseased males** M T Lategola (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.) and P J Layne (MarDen Enterprises, Las Cruces, N Mex.) *Aviation, Space, and Environmental Medicine*, vol 46, July 1975, p 946-952 34 refs

A resting 'normal' ECG can coexist with known coronary heart disease (CHD) Combined sensitivity and specificity errors of at least 10% in exercise ECGs are not unusual Improved screening for CHD was attempted using amplitude/frequency analysis of ECG recordings Thirty normal males and 30 with documented CHD were selected The ECGs were recorded on electromagnetic tape during supine rest Analysis provided digital conversion, selection of four ECG segments, time-normalization and amplitude/frequency analysis Analyses provided one digital, plot per each segment and one per each 30-subject average The results from one ECG lead are presented Significant differences (p less than or equal to 0.05) appeared in the comparisons between the normal and CHD groups Retrospectively, amplitude criteria individually screened normal from CHD males to an improved degree compared with exercise ECGs (Author)

A75-38422 **Medical flying fitness - a routine affair - but who examines and assesses psychic health** H -P Goerres (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Furstenfeldbruck, West Germany) *Aviation, Space, and Environmental Medicine*, vol 46, July 1975, p 953-957 12 refs

The regular medical examination of pilots is presently accepted as a thorough diagnosis of flying fitness, although the psychological aspects are sometimes almost completely ignored Computer-aided procedures for the best possible appraisal of flying fitness are discussed It is shown that the flying fitness examination procedure presently oriented towards the somatical status is by no means sufficient to determine the actual degree of flying fitness and may be detrimental to the flight safety and health of the individual pilot S D

A75-38507 # **A stable combination of electrodes for an electroretinographic investigation** V S Gavriiski (Vissh Institut za Fizkultura, Sofia, Bulgaria) *Bolgarskaia Akademiia Nauk, Doklady*, vol 28, no 5, 1975, p 689-692 5 refs

The use of special equipment is described for connecting a patient undergoing electroretinographic examination with the electrodes The equipment consists of an eyeglass frame on which electrodes of various kinds are fixed Silver lamellar electrodes are fixed to the lower rims of the frame - these electrodes make contact with the eye, a ground electrode is fastened to the rim of the frame and makes contact with the patient's nose, finally, neutral electrodes on the arms of the frame contact the patient's temporal skin This method offers several advantages over the contact corneal electrode method It is easier to administer and the ERG amplitude requires lower voltage than that of ERG recorded by a contact electrode P T H

A75-38508 # **Cytological reaction of the arterial wall to injury** Z Jurukova (Academy of Medicine, Research Group of Hypertension, Sofia, Bulgaria) *Bolgarskaia Akademiia Nauk, Doklady*, vol 28, no 5, 1975, p 701-704 10 refs

Experimental injury of the arterial wall, leading to restoration by intimal proliferation, was induced on the common carotid artery of Wistar rats in order to study the cellular components of the reparative thickening of the arterial intima Three different cell types were found in the thickened arterial intima (1) monocytes which migrated from the blood flow, (2) modified smooth-muscle cells showing marked increase in the amount of mitochondria and of the granular endoplasmatic reticulum, and (3) cells of star-like configuration with long and thin cytoplasmic processes whose identification as modified smooth-muscle cells or as fibroblasts is not certain The difference in the ultrastructure of the cellular elements from the different layers of the intimal thickening is most likely only a manifestation of a different functional state of the same cell type the smooth muscle cells P T H

A75-38536 **Measurement of peak rates of left ventricular wall movement in man - Comparison of echocardiography with angiography** D G Gibson (Brompton Hospital, London, England) and D J Brown (Westminster Hospital, London, England) *British Heart Journal*, vol 37, July 1975, p 677-683 12 refs

Estimates of peak systolic and diastolic rates of left ventricular wall movement were made in 23 patients by echocardiography and angiocardiography Echocardiographic measurements were calculated as the rate of change of the transverse left ventricular dimension, derived continuously throughout the cardiac cycle These were compared with similar plots of transverse left ventricular diameter, in the same patients, derived from digitized cineangiograms taken within 10 minutes of echocardiograms The results indicate close correlation between the two methods, and suggest that either can be used to measure peak rates of left ventricular wall movements in patients with heart disease (Author)

A75-38538 **Hybrid calculators for the analysis of cardiac arrythmias (Hybrid-Rechner zur Analyse cardialer Arrhythmien)** R Mauser and H Schwingshackl *Elektronik*, vol 24, July 1975, p 61-64 In German

A hybrid computer is described that quantitatively detects both normal and pathological heart rhythms and makes them accessible to the physician in digital form The device is very helpful in cardiac therapy, where it enables a far more exact prescription of antiarrhythmic substances to be made than do conventional methods, such as the electrocardiogram During the acute phase of a myocardial infarction, it can detect most of the early symptoms of the often fatal final ventricular fibrillation S J M

A75-38608 **Waves in the eye and ear /Sixth Annual Fairey Lecture/** D E Broadbent (Oxford University, Oxford, Medical Research Council, London, England) *Journal of Sound and Vibration*, vol 41, July 8, 1975, p 113-125 13 refs

Experiments are described which indicate that the basic information provided by the senses comes from a distribution of events over a fairly substantial number of sensitive points, and not solely from an isolated transmission of information about a single point as classically assumed In the case of the eye, the traditional discrete stimulus or 'typewriter' model could be fit to individual receptors (rods and cones) in the retina, as for the ear, each hair cell along the basilar membrane responds to a particular frequency moreover, the

simple Fourier components of a complex wave can often be heard as if separate by the listener Evidence for difficulties with the discrete model is the finding that difference frequencies (sidebands) can be detected by the ear which have for all practical purposes no sonic energy, this phenomenon is not due to nonlinear distortion by the inner ear, but to stimulation of a particular set of receptors Similarly, the eye has been shown to respond to specific spatial frequencies distributed over the entire visual field S J M

A75-38616 Origin of life - Clues from relations between chemical compositions of living organisms and natural environments. A Banin and J Navrot (Jerusalem, Hebrew University, Rehovot, Israel) *Science*, vol 189, Aug 15, 1975, p 550, 551 16 refs

When elemental enrichment factors in living organisms are plotted against the ionic potential of the elements, a strikingly similar pattern is found for different groups of organisms, the pattern is also similar, in its general features, to that found in seawater These relationships support the idea that life began in a water-rich environment interfacing with the primitive atmosphere of the earth (Author)

A75-38634 The visual aptitude of inspection personnel for magnetic-particle and penetrant testing (Visuelle Eignung des Prufpersonals fur Magnetpulver- und Eindringverfahren) F Michalski (Stahlwerke Rochling Burbach GmbH, Volklingen, West Germany), D Kaiser (Mannesmannrohren-Werke AG, Dusseldorf, West Germany), and M Stadthaus (Bundesanstalt fur Materialprufung, Berlin, West Germany) *(Deutsche Gesellschaft fur Zerstorungsfreie Prufverfahren, Vortragstagung uber Zerstorungsfreie Materialprufung, Berlin, West Germany, May 5-7, 1975) Materialprufung*, vol 17, July 1975, p 233-235 13 refs In German

The requirements regarding the visual capacities of persons who are to be employed with the conduction of magnetic-particle inspection tests or tests involving the use of a penetrant are considered Directions for testing the vision of the inspection personnel are discussed, giving attention to international, American, and British specifications G R

A75-38667 Central inhibitory interactions in human vision V Virsu and H Taskinen (Helsinki, University, Helsinki, Finland) *Experimental Brain Research*, vol 23, July 11, 1975, p 65 74 19 refs Research supported by the Academy of Finland

Experiments are reported in which contrast threshold and perceived orientation of one line segment were found to alter with both monoptic and dichoptic masking by a second line segment The masking increased contrast threshold, and the largest change in perceived orientation due to masking was observed at a 15-deg masking angle Results support the hypothesis that there are lateral inhibitory interactions between central neural units in the human visual system S J M

A75-38669 The fractional rate of change of ventricular power during isovolumic contraction - Derivation of haemodynamic terms and studies in dogs P D Stein, G G McBride, and H N Sabbah (Oklahoma, University, U S Veterans Administration Hospital, Oklahoma City, Okla) *Cardiovascular Research*, vol 9, July 1975, p 456-467 16 refs Research supported by the U S Veterans Administration and American Heart Association, Grant No PHS-NHLI-72-2921-B

STAR ENTRIES

N75-26629*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt Md
APPLICATION OF LUCIFERASE ASSAY FOR ATP TO ANTIMICROBIAL DRUG SUSCEPTIBILITY TESTING Patent Application
Emmett W Chappelle Grace L Picciolo Michael J Barza (New Engl Med Center) Louis Weinstein (New Engl Med Center), Stephanie A Tuttle (New Engl Med Center) and Hillar Vellend, inventors (to NASA) (New Engl Med Center) Filed 30 Apr 1975 29 p
(NASA-Case-GSC-12039-1 US-Patent-Appl-SN-572991) Avail NTIS HC $3 75 CSCL 06M

A method is described for measuring the susceptibility of bacteria to antimicrobial agents by utilizing the bioluminescent reaction between adenosine triphosphate (ATP) and luciferase-luciferin mixtures The bacterium is cultured in a growth medium and the amount of ATP in a sample of the bacterium is determined by measuring the amount of luminescent light emitted when the bacterial ATP is reacted with a luciferase-luciferin mixture A fresh sample of the bacterium is then subjected to an antibiotic agent and the amount of bacterial ATP is assayed after the antibiotic treatment in the same manner The ATP index is determined from the values obtained from the assay procedures NASA

N75-26630*# Massachusetts Inst of Tech , Cambridge Dept of Nutrition and Food Science
MECHANISMS OF DETERIORATION OF NUTRIENTS Annual Report, 13 Mar 1974 - 13 Mar 1975
Marcus Karel and James M Flink 13 Mar 1975 215 p refs (Contract NAS9-12485)
(NASA-CR-141866) Avail NTIS HC $7 25 CSCL 06H

The retention of flavor during freeze drying was studied with model systems Mechanisms by which flavor retention phenomena is explained were developed and process conditions specified so that flavor retention is optimized The literature is reviewed and results of studies of the flavor retention behavior of a number of real food products, including both liquid and solid foods are evaluated Process parameters predicted by the mechanisms to be of greatest significance are freezing rate, initial solids content, and conditions which result in maintenance of sample structure Flavor quality for the real food showed the same behavior relative to process conditions as predicted by the mechanisms based on model system studies Author

N75-26631*# California Univ Los Angeles
CONTINOUS ANIMAL EXPOSURE TO A MIXTURE OF DICHLOROMETHANE AND 1,1,1-TRICHLOROETHANE Final Report
1975 25 p refs
(NASA Order T-9035-B)
(NASA-CR-141889) Avail NTIS HC $3 25 CSCL 06C

An investigation of the effects of combined exposure of animals to dichloromethane and 1 1 1-trichloroethane was conducted using atmospheric concentrations of each solvent which had individually produced minimal measureable effects on livers Previously established spacecraft threshold limit values for the individual solvent compounds were studied to determine validity when both were present in an astronaut's breathing environment under continuous exposure conditions Results show that the combined effect of 90-day continuous exposure of animals to 100 ppm dichloromethane and 1000 ppm 1,1, 1-trichloroethane is no greater than the effect of each alone While the exposed livers of mice appeared to contain slightly more fat the degree of increased liver weight and the liver-to-body ratios are slightly lower than those measured for each solvent alone Author

N75-26632*# Scientific Translation Service, Santa Barbara, Calif
RELATIONSHIP BETWEEN ADMINISTRATION TIME OF DRUGS AND ACUTE TOXICITY IN MICE
Washington NASA Jun 1975 17 p refs Transl into ENGLISH from Pharmacologica Japonica, V 71, 1975 p 29-37
(Contract NASw-2483)
(NASA-TT-F-16411) Avail NTIS HC $3 25 CSCL 06T

Drugs were injected into dd-strain mice every four hours at 0200, 0600, 1000, 1400, 1800 and 2200 hours and the cumulative mortality rate was calculated for 72 hours through periodic observations The following results were obtained (1) With respect to central stimulants specifically, N-methyl D-aspartic acid, picrotoxin pentetrazol, and strychnine-H2SO4, the mortality rate of mice injected at 2200 hours was the lowest, while a generally high rate was registered for mice injected at 0200 1000, and 1800 hours At least two or more peaks in the mortality rate were noted (2) In the case of central depressants such as chlorpromazine and Na-methylhexabital mice injected at 1000 hours registered the lowest mortality rate, while the highest mortality rate was at 1400 and 1800 hours, with one peak Author

N75-26633*# California Univ Davis
EVALUATION OF THE EFFECTS OF HYPERGRAVITY EXPOSURE AND CAGING RESTRAINT ON BONE MINERALIZATION IN THE BEAGLE BY IN VIVO PHOTON ABSORPTIOMETRY Final Progress Report
Gerald L Fisher Karen L Berding, and Marvin Goldman May 1975 29 p refs
(NASA Order A-98313-A)
(NASA-CR-137710) Avail NTIS HC $3 75 CSCL 06S

Photon absorptiometry was used to evaluate bone mineral kinetics associated with normal development and the possible perturbations to bone development resulting from hypergravity exposure over a period of six months in developing Beagles A series of seven measurements were performed at specific times with the first measurement prior to treatment and subsequent measurements at 2, 5, 9 14, 20 and 26 weeks from the onset of the experiment Four groups of six male Beagle pups, ranging in age from 85 to 92 days were studied Two groups were chronically exposed to hypergravity treatments by centrifugation of 2 0 G (18 0 RPM, 11 7 ft radius) and 2 6 G (18 0 RPM, 19 8 ft radius) for the 26 week period A third group of six dogs served as a caged control to evaluate possible changes due to confinement in small plexiglass cages similar to those of the centrifuge Thus this control group was subjected to limited exercise due to caging restraint The fourth group of animals was housed in open runs to allow exercise without the spatial confinement of the smaller plexiglass cages Results show highly significant differences in body weight, bone length, increase in bone density of control group relative to other groups, and a decrease in bone mineral content in the two gravity treated groups Author

N75-26634*# Kanner (Leo) Associates, Redwood City, Calif
A MONTH ALONE WITH CHLORELLA
S Stankovich Washington NASA Jul 1975 8 p Transl into ENGLISH from Khimiya i Zhizn (USSR), no 5, 1974 p 58-63
(Contract NASw-2481)
(NASA-TT-F-16463) Avail NTIS HC $3 25 CSCL 06P

A subject lived in a hermetically-sealed, 4 5 cu m room for 30 days During this time his oxygen was completely supplied by chlorella grown in a special reactor After a time, the system achieved a degree of stability carbon monoxide and methane accumulation stabilized after 3 and 12 days, respectively Waste materials were broken down and purified in a miniature 'aerotank,' similar to those used for city wastes Water for drinking, food preparation and hygiene was collected from condensation on the reactor and from moisture secreted by the subject s skin and lungs as well as from waste matter 50 g of dried chlorella were included in the subject s diet The life-support system showed no sign of change at the end of the experiment, additional plants and especially animals would improve the system, e g , make it a 100% closed CO2 cycle system Author

N75-26635# Advisory Group for Aerospace Research and Development, Paris (France)
A REVIEW OF ANTHROPOMETRIC DATA OF GERMAN AIR FORCE AND UNITED STATES AIR FORCE FLYING PERSONNEL, 1967 - 1968
H J Grunhofer, ed (German Air Force) and G Kroh ed (German Air Force Inst of Aviation Med) Apr 1975 180 p refs
(AGARD-AG-205, AGARDograph-205) Avail NTIS HC $7 00

Standardized equipment, definitions and procedures were used according to Hertzberg for each program Both data collections were obtained from preselected personnel and are not representative of the whole male population of the respective country, however, the results are representative of the reference collectives For each body dimension the following detailed information is given the definition written and illustrated of body dimension to be measured, the frequency of certain ranges a breakdown of GAF and USAF data in percentile essentials on the statistics of data distribution The correlation matrix of GAF data is also included Author

N75-26636*# Public Health Service Hospital Staten Island, N Y
RENAL EFFECTS OF CONTINUOUS NEGATIVE PRESSURE BREATHING Final Report
Michael J Kinney and Vincent A DiScala [1975] 20 p refs
(NASA Order T-2950-A)
(NASA-CR-141888) Avail NTIS HC $3 25 CSCL 06P

Continuous negative pressure breathing (CNPB) was utilized to simulate the thoracic vascular distension of zero g or space, in 11 anesthetized rats The animals underwent renal clearance and micropuncture renal nephron studies before, during, and after CNPB Rats were pretreated with a high salt diet and I-M desoxycorticosterone (DOCA) in excess None of these rats diuresed with CNPB In contrast 5 of the 7 remaining rats increased the fraction of the filtered sodium excreted (C sub Na/GFR, $p < 05$) and their urinary flow rate (V $p < 05$) Potassium excretion increased (U sub k V, $p < 05$) End proximal tubular fluid specimen's TF/P inulin ratios were unchanged Whole kidney and single nephron glomerular filtration rates fell 10% CNPB, a mechanism for atrial distension, appears to cause in rats, a decrease in distal tubular sodium water and potassium reabsorption Exogenous mineral-corticoid prevents the diuresis, saluresis, and kaluresis Author

N75-26637*# Scientific Translation Service, Santa Barbara, Calif
REDOX TRANSFORMATIONS OF NICOTINAMIDE-ADENINEDINUCLEOTIDE IN SKELETAL MUSCLES DURING WORK AND AT REST
N R Chagovets and L G Leshkevich Washington NASA Jun 1975 13 p Transl into ENGLISH from Vop Med Khim (USSR), v 20, no 4, Jul -Aug 1974 p 425-429
(Contract NASw-2483)
(NASA-TT-F-16432) Avail NTIS HC $3 25 CSCL 06P

The determination of beta-hydroxy butyrate dehydrogenase substrate content in rat skeletal muscles is described as a means of more closely evaluating redox transformation of free nicotinamide-adenine-dinucleotide (NAD) in muscle cell mitocnondria both at rest and after intense work (15 minutes swimming) During work, muscle NAD reduction uses glycolytes, at rest, NAD reduction takes place using free mitochondrial NAD The dynamics of pyruvate (lactate and acetoacetate) beta-hydroxy butyrate ratios in the blood are the same as that in the skeletal muscles, and can be used as an index to skeletal muscle energy metabolism Author

N75-26638*# Scientific Translation Service, Santa Barbara, Calif
HOW'S YOUR HEALTH, COSMONAUT?
I Bryanov and R Bayevskiy Washington NASA 14 Jun 1975 7 p Transl into ENGLISH from Izvestiya (USSR), 8 Feb 1975 p 5
(Contract NASw-2483)
(NASA-TT-F-16331) Avail NTIS HC $3 25 CSCL 06P

The function of medical specialists during spaceflights is to compare the cosmonaut's current physical state with his previous one, and to predict future health The three concepts (current, past and future physical state), and methods for determining them are discussed Heuristic, mathematical, and clinico-physiological approaches to predicting the physical state are described The H Selye adaptation syndrome is discussed along with a way of monitoring the organisms' approach to the 'over-exertion zone' by mathematical analysis of cardiac rhythm Author

N75-26639*# Scientific Translation Service, Santa Barbara Calif
EFFECT OF LUMISTEROL-3 ON THE CALCIUM ABSORPTION IN THE GUT AND ON THE CALCIFICATION OF BONE TISSUE
N N Govseyeva Washington NASA Jun 1975 9 p refs Transl into ENGLISH from Prikl Biokhim Mikrobiol (USSR) v 10, no 4 Jul - Aug 1974 p 581-583
(Contract NASw-2481)
(NASA-TT-F-16422) Avail NTIS HC $3 25 CSCL 06P

The effect of lumisterol-3 on calcium transport in the intestines and on bone tissue calcium absorption was examined in vitro on the large tibial bone of white leghorn chicks Four groups of animals were kept on a rachitogenic diet for one month after which one group remained controls, another was administered 400 IU of vitamin D sub 3, the third was administered a mixture of 200 IU of vitamin D sub 3, and 200 IU of lumisterol-3 The latter mixture proved to be the most effective, in increasing calcium absorption in the intestines Results indicate that lumisterol-3 by itself stimulates more calcium absorption in bone tissue than vitamin D sub 3 Author

N75-26640# Naval Postgraduate School, Monterey, Calif
EEG FREQUENCY ANALYSIS ON THE PDP LAB 8/E COMPUTER SYSTEM M S Thesis
Lawrence Morrison Gorham Sep 1974 42 p refs
(AD-A003522) Avail NTIS CSCL 06/5

This thesis describes the analysis, method and computer programs used to obtain the Fast Fourier Transformation (FFT) of an electroencephalogram (EEG) using a small laboratory computer like the PDP Lab 8/E The EEG power spectrum was then computed from this transformation The information contained in this thesis is intended to enable the user to compute the Fourier coefficients of a set of data points or compute the power spectrum of a real waveform such as the EEG GRA

N75-26641# Institute for Behavioral Research, Inc , Silver Spring, Md
EFFECTS OF MICROWAVE IRRADIATION ON EMBRYONIC BRAIN TISSUE Final Report, 15 Oct 1973 - 14 Oct 1974
David McK Rioch 20 Nov 1974 12 p refs
(Contract DAHC04-74-C-0004)
(AD-A004024, Rept-151, ARO-11739 1-L) Avail NTIS CSCL 06/18

Several groups of dated pregnant rats were exposed starting on the 13th day of gestation in the anechoic chambers or in a calibrated oven All the exposures to microwave irradiation were conducted after 0700 and before 1500 hours The rats were sacrificed on the 19th day of gestation, the fetuses weighed and their brains fixed and serially sectioned No differences were found between the irradiated fetuses and the controls which had been similarly handled but not irradiated In a final experiment rats were exposed to irradiation from 1700 to 1900 hours or overnight (from 1800 to 0800 or 1000 hours) at 1700 MHz and 5 or 10 mw/sq cm, on the 6th to the 9th and the 12th to the 16th days of gestation The exposed fetuses were heavier than the controls and the brains larger The difference was approximately 10 percent This finding suggests that the effect may be due to some factor which varies with the circadian rhythm It may also have resulted from the earlier or the repeated irradiation GRA

N75-26642# Pennsylvania Univ , Philadelphia
STUDY OF THE IN VIVO MECHANICAL PROPERTIES OF THE BLOOD VESSELS AND THEIR REGULATION Final Report
Lysle H Peterson 1975 31 p refs

(Contract N00014-67-A-0216-0025)
(AD-A003613) Avail NTIS CSCL 06/16

The general objective of the program was to increase and improve knowledge and understanding of the properties and behavior of the circulatory system under normal operating and diseased conditions The diseased condition being emphasized was hypertension, although the study related to other abnormal states such as shock and also provided insight into the arteriosclerotic process The study dealt extensively with the chemical metabolic and physical characteristics of blood vessels and with how nervous, endocrine and renal functions control cardiovascular properties and behavior An important aspect of the study was the approach being taken, i e , the systems approach GRA

N75-26643# Army Chemical Center, Edgewood, Md
A REVIEW OF THE TOXICOLOGY OF COLORED CHEMICAL SMOKES AND COLORED SMOKE DYES
Edmund J Owens and Dorothy M Ward Dec 1974 71 p refs
(DA Proj 1C5-22301-A-079)
(AD-A003827, EB-TR-74064) Avail NTIS CSCL 06/20

The report is a review of the inhalation (total-body-exposure) studies performed by this laboratory during 1966 with the **M18** series of colored smokes The acute toxicities of the smokes, the times to death, and the gross signs are compared A literature survey and toxicological evaluation of the various dyes in the violet, green and red smoke mixtures are included Studies necessary for definition of the hazards incident to the use of the dye components in manufacturing and military operations as well as knowledge gaps are described The dyes used in chemical smokes are 1-methylaminoanthraquinone, dibenzo (b def) chrysens-7, 14-dione, 7H-benz (de) anthracene-7-one and 1,4-di-p-toluidinoanthraquinone GRA

N75-26644# Center for Blood Research Boston Mass
FROZEN BLOOD CELL CHANGES Final Report, 1 Sep 1969 - 30 Nov 1974
Fabian J Lionetti 15 Jan 1975 9 p refs
(Contract N00014-69-C-0128, NR Proj 105-440)
(AD-A003611 TR-6) Avail NTIS CSCL 06/16

Several fundamental characteristics of human red cells, bone marrow and peripheral blood granulocytes have been elucidated which have led to enhancement of knowledge concerning blood cell preservation and senescence of red cells The accumulation of calcium ion from plasma in red cells aging in vivo or in blood bags, results in non-deformable cells subject to splenic sequestration Red cell viability depends on prevention of calcium ion entry and accumulation The application of electronic cell sizing makes possible the rapid evaluation of bone marrow and peripheral blood leukocytes Techniques developed for use in pursuit of research for this contract are invaluable as they permit rapid and simple assessment of cell quality affording means to optimize preservation and yielding viable post-thawed cells GRA

N75-26645# Union Carbide Corp Tarrytown N Y
ACCESS DIVER PERFORMANCE AND PHYSIOLOGY IN RAPID COMPRESSION TO 31 ATMOSPHERES
R W Hamilton Jr T C Schmidt D J Kenyon M Freitag, and M R Powell 1 Dec 1974 87 p refs Prepared in cooperation with Ocean Systems Inc Tarrytown N Y
(Contracts N00014-74-C-0415 N00014-74-C-0424 N00014-74-C-0189)
(AD-A003514 CRL-T-789) Avail NTIS CSCL 06/19

In a series of simulated dives--called Access-compressions were made to 800 and 1000 feet of sea water from sea level and also to these depths from holding depths of 500 and 600 feet of sea water Compression rate was 100 feet per minute with one or two one-minute stops The breathing gas was 3 5% oxygen and 13% nitrogen, balance helium to give a bottom gas mixture of approximately 1 atmosphere of oxygen and about 4 atmospheres of nitrogen The experimental program showed clearly that diving to 1000 feet of sea water can be accomplished efficiently and safely by means of excursions from moderate depths, and provided decompression procedures for such excursions It was further shown that present saturation decompression practice can probably not be accelerated very much, and that a practical limit for present open-circuit breathing apparatus is being approached GRA

N75-26646# Union Carbide Corp , Tarrytown N Y
NEON DECOMPRESSION Final Report, 1 Jan - 31 Dec 1974
R W Hamilton, Jr M R Powell, D J Kenyon and Mark Freitag 31 Dec 1974 20 p refs
(Contract N00014-74-C-0424, NR Proj 201-088)
(AD-A003506 CRL-T-797) Avail NTIS CSCL 06/19

During the current contract year this Laboratory has conducted a feasibility program on the applications of neon in mixed-gas diving The neon source studied was a by-product of the manufacture of atmospheric gases it is composed of 25% helium, 75% neon To develop the decompression tables modifications of classical theory were applied to existing diving data, mainly experience with helium The resulting decompression schedules proved to be unexpectedly troublesome in causing sensory problems and delayed effects--whether designed for helium or neon--and satisfactory decompressions could be achieved only if oxygen breathing was included The planned array of tests over a range of depths and times (150-400 feet sea water and 30-120 min) was set aside, and efforts were concentrated on producing a dependable table for 250 feet sea water/60 min GRA

N75-26647# Union Carbide Corp , Tarrytown N Y
STUDIES OF DECOMPRESSION PHENOMENA Final Report, 1 Jan - 31 Dec 1974
Michael R Powell 31 Dec 1974 18 p refs
(Contract N00014-74-C-0415, NR Proj 201-035)
(AD-A003513 CRL-T-800) Avail NTIS CSCL 06/19

The report describes biophysical studies of the etiology of decompression sickness and methods for its early detection The authors have made an extensive study of bubble detection in the precordial region of human divers by means of the Doppler ultrasound bubble detector Results indicate that only a fair correlation exists for premonitory detection of decompression sickness if this is the sole monitoring site Gas uptake and elimination in the skeletal muscle of rabbits for nitrogen and argon was studied Within the limits of accuracy, no difference between the halftimes for argon or nitrogen could be detected Elimination was found to be slower than uptake for both gases These measurements were made simultaneously for both gases by means of in situ probes and a mass spectrometer analyzer GRA

N75-26648# Environmental Health Lab Kelly AFB Tex
INDUSTRIAL HYGIENE SURVEY 123RD TACTICAL CONTROL SQUADRON (CRP), OH ANG, BLUE ASH OH 45242 Final Technical Survey Report
Lawrence W Grauvogel Dec 1974 27 p refs
(AD-A003491 EHL(K)-74-29) Avail NTIS CSCL 06/10

A hazardous noise and industrial hygiene survey was conducted 23-26 September 1974 Personnel exposed to potentially hazardous noise and sources and areas of potentially hazardous noise are identified by shop Ventilation is discussed for the shops and recommendations made Comprehensive listing by shop of chemicals used and composition are included to aid the physician in identification of the possible source of occupational illnesses GRA

N75-26649# School of Aerospace Medicine Brooks AFB, Tex
PRINCIPLES OF BIODYNAMICS INTRODUCTION TO GRAVITATIONAL BIOLOGY, 1
Arthur H Smith Nov 1974 51 p refs
(AD-A003624 SAM-Review-8-74 SAM-TR-74-44) Avail NTIS CSCL 06/19

Gravity and other acceleration fields affect exposed organisms through the induced weight-to-mass ratio which is generally indicated as G Biological response to such fields and to changes in field strength, is the subject matter of gravitational biology Immediate response to increases in the ambient acceleration

field includes the greater energy requirement for mechanical work and displacement of materials in nonrigid systems There also are secondary changes such as an increased nutritional requirement and blood volume increase A particularly important condition to gravitational biology is weightlessness Here the effects of earth-gravity are removed and the intensities of the remaining biological functions are mass determined This review deals with the physical bases of gravitational biology and the descriptive terminology available GRA

N75-26650# National Bureau of Standards, Boulder, Colo Cryogenics Div
EFFLUX OF GASEOUS HYDROGEN OR METHANE FUELS FROM THE INTERIOR OF AN AUTOMOBILE Final Technical Note
J M Arvidson, J Hord, and D B Mann 1 Mar 1975 59 p refs Sponsored in part by General Services Admin
(COM-75-10288/9 NBS-TN-666) Avail NTIS HC $4 25 CSCL 13F

Gasoline-powered automobiles are being converted to operate on gaseous fuels such as H2 or CH4 These fuels are commonly stored in containers located in the trunk of the car Potential leakage of these gaseous fuels into the passenger compartment of the vehicle constitutes a safety threat Definitive experiments were performed to identify the explosion hazards establish venting criteria and obviate general safeguards for H2 or CH4 fueled passenger vehicles GRA

N75-26651*# Essex Corp Huntsville, Ala
EARTH ORBITAL TELEOPERATOR MANIPULATOR SYSTEM EVALUATION PROGRAM
M Kirkpatrick III, N L Shields Jr P N Frederick R Brye and T B Malone Feb 1975 84 p refs
(Contract NAS8-30545)
(NASA-CR-143874 Rept-2) Avail NTIS HC $4 75 CSCL 05E

The performance of an orbital teleoperator system which includes small dextrous servicing manipulators to be used in satellite servicing was examined System/operator performance testing was implemented and the results of a fine positioning control test using two different manipulator systems varying widely in manipulator configuration and control systems are presented Fine position control is viewed as representing a fundamental requirement placed on manipulator control The relationship of position control to more complex tasks which directly represent on-orbit servicing operations are also presented Author

N75-26652*# Essex Corp , Huntsville, Ala
EARTH ORBITAL TELEOPERATOR VISUAL SYSTEM EVALUATION PROGRAM
N L Shields Jr , M Kirkpatrick III, P N Frederick, and T B Malone Feb 1975 85 p refs
(Contract NAS8-30545)
(NASA-CR-143875, Rept-3) Avail NTIS HC $4 75 CSCL 05E

Empirical tests of range estimation accuracy and resolution via television under monoptic and steroptic viewing conditions are discussed Test data are used to derive man machine interface requirements and make design decisions for an orbital remote manipulator system Remote manipulator system visual tasks are given and the effects of system parameters of these tasks are evaluated E H W

N75-26653# Civil Aeromedical Inst , Oklahoma City Okla
A REALISTIC VIEW OF THE PEOPLE IN AIR TRAFFIC CONTROL
Roger C Smith Dec 1974 6 p refs
(AD-A006789 FAA-AM-74-12) Avail NTIS HC $3 25 CSCL 05/5

An overview of research findings on air traffic controllers is presented Results of personality aptitude motivation interest and attitude studies are considered in terms of the general pattern of characteristics found to be associated with success in the air traffic profession The implications of these findings for managerial programs are discussed Author

N75-26654# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt Bad Godesberg (West Germany) Abteilung Luftfahrtpsychologie
FACTOR ANALYSIS OF A NEW MULTI-DIMENSIONAL PERSONALITY QUESTIONNAIRE A CHECK OF THE FACTOR MODEL IN COMPARISON WITH SIMILAR METHODS
Helmut Kirsch Klaus-Martin Goeters, and Rainer Ewe 21 Jan 1975 26 p refs In GERMAN ENGLISH summary
(DLR-FB-75-20) Avail NTIS HC $3 75 DFVLR Porz West Ger 12,20 DM

A personality inventory the Temperament-Structure-Scales was developed for the psychological selection of aviation personnel The inventory includes questions about attitudes behavior and biographical events The questions are arranged in nine trait scales which are described The nine scales were split in half (odd-even) The matrix of correlations of the resulting 18 half-scales was factor-analyzed The results are reported and compared with a similar research on the 16 P-F-test and on the HSPQ The psychometric data are discussed The assumed 9-factor-structure was confirmed sufficiently This structure of traits seems to correspond with conceptions which parents and social environment have about educational aims Author (ESRO)

N75-26655# Stanford Univ Calif Dept of Computer Science
INFORMATION PROCESSING ANALYSIS OF VISUAL PERCEPTION A REVIEW
A J Thomas and T O Binford Jun 1974 62 p refs
(Contract DAHC15-73-C-0435, ARPA Order 2495)
(AD-A003483 SU-STAN-CS-74-408 SU-AIM-227) Avail NTIS CSCL 05/10

It is suggested that recent advances in the construction of artificial vision systems provide the beginnings of a framework for an information processing analysis of human visual perception A review is made of some pertinent investigations which have appeared in the psychological literature along with some of the salient and potentially useful theoretical concepts which have resulted from the attempts to build computer vision systems An attempt is made to integrate these two sources of ideas to suggest some desirable structural and behavioral concepts which apply to both the natural and the artificial systems GRA

N75-26656# Computer Image Corp , Denver Colo
THE EFFECTS OF OBSERVER CONTROL OVER VISUAL INFORMATION IN CLASSIFICATION PERFORMANCE Final Technical Report
Louis Cicchinelli and Joseph Halpern Nov 1974 77 p refs Prepared in cooperation with Denver Univ
(Contract N00014-74-C-0117)
(AD-A003953) Avail NTIS CSCL 05/10

A series of experiments is reported which investigated the effects on performance of observer control over certain information parameters of a dynamic visual display The results showed that classification performance was enhanced when experienced observers could eliminate and attenuate information When naive observers were presented with this attenuated information set, their performance was superior to that of a comparable group shown the entire information set These results were consistent across two different but related sets of stimuli ambient sea noises and ship sounds GRA

N75-26657# Air Force Inst of Tech Wright-Patterson AFB Ohio School of Engineering
THE MATRIX ORGANIZATION IN ASD A STUDY IN COLLOCATION OF ENGINEERS M S Thesis
Cheryl L Moyer Sep 1974 269 p refs
(AD-A003604 GSM/SM/74D-9) Avail NTIS CSCL 05/9

The purpose of this study is to determine if there are peculiar human relations problems associated with the matrix form of organization as applied in the Aeronautical Systems Division (ASD) of the Air Force Systems Command The data for this study was gathered by the interview questionnaire method The questionnaire was designed to determine the work motive values job satisfaction and the current work conditions or climate as

perceived by the engineers interviewed The analyses consisted mainly of (1) Contingency Table Tests (2) Tabulations and (3) Subjective Comparisons The major variables selected for analysis were (1) work assignment categories of (a) dedication (b) collocation and (c) functional (not collocated or dedicated) (2) work location categories of (a) ASD SPO (b) Super SPO and (c) Home Office (3) civilian or military and (4) age categories of (a) under 35, (b) 35 through 49 and (c) 50 and older The major findings of the analyses were grouped into eight major categories and recommendations relevant to each category were made GRA

N75-26658# Illinois Univ Savoy Aviation Research Lab
ENHANCEMENT OF HUMAN EFFECTIVENESS IN SYSTEM DESIGN, TRAINING, AND OPERATION Annual Progress Report, 1 Jul 1973 - 30 Jun 1974
Jun 1974 20 p refs
(Contract F44620-70-C-0105)
(AD-A004149 ARL-74-19/AFOSR-74-13 AFOSR-75-0073TR) Avail NTIS CSCL 05/10

The Progress Report is concerned with research performance and results on the contract during the period 1 Jul 1973 - 30 June 1974 On a very general classification level the tasks are of two general types those dealing with human resources research and those dealing with manned systems research More specifically four tasks (2 4 5 and 8) deal primarily with pilot selection and training performance assessment and the prediction of future operational effectiveness three tasks (1 3 and 7) deal with human perceptual and decision processes and with principles of aviation display, control and computer-assisted manned system design and Task 6 bridges both major research categories Furthermore several of the tasks (particularly 1 4 6, 7 and 8) are aimed at advancing human factors research methodology and theory GRA

N75-26659# Naval Postgraduate School, Monterey, Calif
PREDICTION OF PERFORMANCE AND SATISFACTION OF AERONAUTICAL ENGINEERING STUDENTS AT THE NAVAL POSTGRADUATE SCHOOL M S Thesis
Charles Theodore Sofge Sep 1974 79 p refs
(AD-A003539) Avail NTIS CSCL 05/10

A primary objective of this research was the development of predictors of academic performance and satisfaction for aeronautical engineering students Three basic types of data used to develop predictors were biographical (historical) academic aptitude (graduate record exam) and individual interests (strong vocational interest blank) data Several successful predictors of performance were developed but further research is required to successfully predict student satisfaction GRA

N75-26660# Naval Postgraduate School, Monterey, Calif
PERIODIC VARIATIONS IN HUMAN PERFORMANCE M S Thesis
Francis Leroy Sink Sep 1974 50 p refs
(AD-A003517) Avail NTIS CSCL 05/10

This paper investigates the periodic variation in human performance predicted by Biorhythm theory Fourier analysis was performed on performance data of three subjects The results indicated that the postulated basic biorhythmic cycles exist Comparison of the phase of predominate experimental frequency with the phase predicted by biorhythm indicated that the frequencies may not be as stable as the theory suggests GRA

N75-26661# Air Force Inst of Tech Wright-Patterson AFB, Ohio
A STUDY OF THE PERSONAL VALUE SYSTEMS AND JOB SATISFACTIONS OF UNITED STATES AIR FORCE OFFICERS M S Thesis
John A Madia Oct 1974 105 p refs
(AD-A003602, GSM/SM/74D-7) Avail NTIS CSCL 05/10

The primary objectives of this research were to gain insights into the personal value systems and job satisfactions of Air Force officers Prior to analyzing data, the paper discusses the role of values in human behavior and outlines the major job satisfaction theories currently in the literature Using an adaptation of England's methodology the primary orientations (POR) of 1321 officers, as well as the behavioral relevance of 77 personal values (PV) concepts were determined A modification of Hoppock's general job satisfaction blank was used to measure the satisfactions of the officers Through tests of means and analysis of distributions, the satisfactions of the various officer subgroups were then compared GRA

N75-26662# Naval Postgraduate School, Monterey, Calif
VISUAL SEARCH PROCESSES OF COAST GUARD AIRCREWMEN M S Thesis
David Allen Jones Dec 1974 61 p refs
(AD-A004252) Avail NTIS CSCL 05/10

The thesis presents the various components of the visual search process as it applies to Coast Guard lookouts It begins with a description of the human eye and follows with an introduction to detection lobe theory Next the most distinct region of daylight vision the foveal vision area, is discussed GRA

N75-26663# Yale Univ, New Haven, Conn School of Organization and Management
HUMAN BEHAVIOR IN PROBLEM SOLVING ENVIRONMENT Final Report
Robert B Fetter 24 Jan 1975 11 p refs
(Contract N00014-67-A-0097-0010, NR Proj 121-408)
(AD-A004305) Avail NTIS CSCL 05/10

The major purpose is to study human behavior in problem solving environments involving the use of computers It was assumed that a major deterrent to effective use of computer technology in problem solving was the lack of knowledge concerning the interaction between man and machine By giving structure to this aspect of problem solving behavior and studying it experimentally, it was felt that knowledge useful in the design and development of decision support systems could be obtained While the study of user behavior was a consistent theme of work accomplished and resulted in some fundamental additions to knowledge, the largest part of the effort was devoted to developing the computer systems technology necessary to provide the experimental environment GRA

N75-26664 Stanford Univ, Calif
FACTORS AFFECTING CONTROL ALLOCATION FOR AUGMENTED REMOTE MANIPULATION Ph D Thesis
Douglas Edward McGovern 1975 236 p
Avail Univ Microfilms Order No 75-13556

A method for predicting the effectiveness of an augmented remote manipulator system is presented Such a system represents the combination of a manipulator with a human operator and a small computer Both the human and the computer have the capability for generating commands to control the manipulator The performance of the integrated man-machine system can be predicted through the combination of manual control data with a model of the augmentation scheme This involves the description of human behavior in a form which allows comparisons of the time required by the human to perform a task with and without augmentation A set of experiments was conducted to generate the necessary human performance data Results from these experiments are used to investigate some aspects of task description and manipulator rating as well as establishing the form of human performance The experimentally derived manual control data can be used to predict the performance of an augmented remote manipulator system Dissert Abstr

N75-26665*# Minnesota Univ Minneapolis
PERSONNEL TECHNIQUES NECESSARY TO MAXIMIZE BIO-BARRIER INTEGRITY AT A MARTIAN RECEIVING LABORATORY *Annual Report, 1 Jul 1974 - 30 Jun 1975*
G S Michaelson and Thomas A Mahoney 30 Jun 1975 13 p refs
(Grant NGL-24-005-160)
(NASA-CR-142963) Avail NTIS HC $3 25 CSCL 06B

The planning of biological isolation measures for the Mars Surface Sample Return Mission is discussed in terms of personnel and organizational management Deficiencies in past operation of the Lunar Receiving Laborator are analyzed It was found that the failure to clearly define relationship among the government

agencies involved and to effectively integrate their objectives and responsibilities was a major cause of Laboratory deficiencies Possible solutions to these problems are presented for application to future missions D M L

N75-26666*# Hamilton Standard, Windsor Locks, Conn
STUDY AND ASSESSMENT OF ADVANCED ETC /LSS APPLICATION TO SPACE SHUTTLE Final Report
Charles L Beal Apr 1975 208 p refs
(Contract NAS9-13964)
(NASA-CR-141872 SVHSER-6523) Avail NTIS HC $7 25 CSCL 06K

A variety of advanced life support components and subsystems are evaluated to determine their potential application to the space shuttle and related vehicles Author

N75-26667*# Southwest Research Inst San Antonio, Tex
A GAS FLOW INDICATOR FOR PORTABLE LIFE SUPPORT SYSTEMS Final Technical Report
R L Bass, III and E C Schroeder May 1975 164 p refs
(Contract NAS9-13575, SwRI Proj 02-3713)
(NASA-CR-141892) Avail NTIS HC $6 25 CSCL 06K

A three-part program was conducted to develop a gas flow indicator (GFI) to monitor ventilation flow in a portable life support system The first program phase identified concepts which could potentially meet the GFI requirements In the second phase, a working breadboard GFI, based on the concept of a pressure sensing diaphragm-aneroid assembly connected to a venturi was constructed and tested Extensive testing of the breadboard GFI indicated that the design would meet all NASA requirements including eliminating problems experienced with the ventilation flow sensor used in the Apollo program In the third program phase, an optimized GFI was designed by utilizing test data obtained on the breadboard unit A prototype unit was constructed using prototype materials and fabrication techniques, and performance tests indicated that the prototype GFI met or exceeded all requirements Author

N75-26668# Forschungsinstitut fuer Anthropotechnik Meckenheim (West Germany)
OPTIMIZATION OF CONTROL SIGNAL GAIN BY SELF-ADJUSTMENT [DIE OPTIMIERUNG DER BEDIENSIGNAL-VERSTAERKUNG DURCH SELBSTEINSTELLUNG]
W Kruse and G Rotbauer Mar 1974 49 p refs In GERMAN, ENGLISH summary
(FB-13) Avail NTIS HC $3 75, Forschungsinst fuer Anthropotech , Meckenheim, West Ger DM 10

An optimization method was developed allowing for continuous adjustment of control gain by the operator An optimal gain was found by measuring errors with 5 control gain settings for a two-dimensional pursuit display, first order tracking system, and fingerstick control The optimal control gain was also optimal with respect to operator load The experiment, with 10 poorly and 5 well trained subjects, showed that the optimal gain was not affected by the degree of training In a second experiment, with control gain continuously adjustable by the subjects themselves, the well trained subjects tended to adjust to the previously determined optimum rather accurately in a short time The poorly trained subjects tended to select the left or right margin of the optimal setting depending on the initial control gain setting ESRO

N75-26669# Navy Experimental Diving Unit, Washington, D C
ABSTRACTS BIOMEDICAL RESEARCH AND UNDERWATER BREATHING APPARATUS EVALUATION DIVES 10 TO 1600 FEET CONFERENCE Final Report
L W Raymond and W H Spaur Apr 1974 33 p Conf held on 1-2 Apr 1974
(AD-A003472 NEDU-23-74) Avail NTIS CSCL 06/19

The report presents the results and tentative conclusions of biomedical research and underwater breathing apparatus evaluation performed in a series of dives ranging from 10 to 1600 feet GRA

N75-26670# Naval Air Development Center Warminster Pa Crew Systems Dept
THE MODULAR ANTI-EXPOSURE SYSTEM
Richard L Bell 25 Jun 1974 27 p
(AD-A003603, NADC-74139-40) Avail NTIS CSCL 06/17

The components of the system are a lightweight, constant-wear, liquid loop garment, an encapsulating life raft, and a thermoelectric portable power plant The full length liquid loop garment worn integrally with a lightweight coverall will be essentially the basic clothing configuration required by the airman for a normal mission In the event of ejection the encapsulating life raft will deploy and completely enclose the airman during parachute descent The portable power plant called the Downed Airman Power Source (DAPS), requires no batteries for its operation It will simultaneously provide heat energy for warming the downed survivor and electrical energy for operation of a survival radio Subjective tests have demonstrated that the Modular Anti-Exposure System performs adequately in maintaining a survivor for up to 24 hours in an extremely low temperature environment GRA

N75-26671# Boeing Computer Services, Inc Seattle, Wash Space and Military Applications Div
PROMETHEUS, A USER ORIENTED PROGRAM FOR HUMAN CRASH DYNAMICS Computer Program User Manual
David W Twigg and Richard N Karnes Nov 1974 270 p refs
(Contract N00014-72-C-0223)
(AD-A004656 BCS-40038) Avail NTIS CSCL 13/12

PROMETHEUS is an efficient user oriented interactive simulation program to study the effects of vehicle crashes on human occupants A vehicle occupant is modeled as a two dimensional seven link, mass-spring dynamic system restrained by seat belt and shoulder harness subject to an arbitrary impulsive force An arbitrary energy absorbing seat interacts with the occupant Detailed descriptions of how to use the program along with a sample example are presented The program is designed to operate on the CDC 6600 computer in either a batch or interactive mode GRA

N75-27684# Technische Universitaet Munich (West Germany)
THE DEVELOPMENT AND APPLICATION OF COMPUTER METHODS AND COMPUTER PROGRAMS FOR THE STRUCTURAL ANALYSIS OF PROTEINS - FOR EXAMPLE THE TRYPSIN-TRYPSIN INHIBITOR COMPLEXES, THE FREE INHIBITORS, AND THE L-ASPARAGINASE Ph D Thesis [DIE ENTWICKLUNG UND ANWENDUNG VON RECHENVERFAHREN UND RECHENPROGRAMMEN ZUR STRUCKTURANALYSE VON PROTEINEN AM BEISPIEL DES TRYPSIN-TRYPSININHIBITOR KOMPLEXES, DES FREIEN INHIBITORS UND DER L-ASPARAGINASE]
Wolfgang Steigemann 25 Jul 1974 121 p refs In GERMAN
Avail NTIS HC $5 25

Structural analysis of the complex between trypsin and the trypsin inhibitor by crystallographic calculations establishes heavy atom positions in isomorph derivatives and phases of the native protein A Fourier synthesis of the complex structures at 2 8 A is provided An atomic model for the trypsin inhibitor is formulated from experimental data up to 1 9 A resolution Crystallographic proof for the tetrameric substructure of L-asparaginase is developed that shows molecular pseudo positions at a 222 point symmetry A probable packing scheme is developed in combination with Patterson functions Transl by G G

N75-27685# Advisory Group for Aerospace Research and Development Paris (France)
VIBRATION AND COMBINED STRESSES IN ADVANCED SYSTEMS
Henning E VonGierke ed (AFSC) Mar 1975 272 p refs In ENGLISH, partly in FRENCH Presented at the Aerospace Med Panel Specialists Meeting Oslo 22-23 Apr 1974
(AGARD-CP-145) Avail NTIS HC $8 50

Operational vibration environments and their psychophysiological effects on performances of crews of aircraft land vehicles, and ships are studied

N75-27686 Royal Air Force Inst of Aviation Medicine, Farnborough (England)
AIRCREW ASSESSMENT OF THE VIBRATION ENVIRONMENT IN HELICOPTERS
B H Rance and J W Chappelow *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 7 p refs

A survey of military helicopter crews was carried out to determine the scope and nature of problems due to vibration Three hundred questionnaires were completed The chief consequences of vibration were discomfort and difficulty in reading displays The occurrence of these effects was associated with significant increases in reported fatigue The major effects were, mainly confined to the larger aircraft Most of the reports from Royal Navy helicopters were associated with hovering or transition to or from the hover, turbulence was found to increase the number of reports of vibration effects Loading of the aircraft was not found to cause any increase in the number of reports
Author

N75-27687 Max-Planck-Institut fuer Landarbeit und Landtechnik Bad Kreuznach (West Germany)
HUMAN EXPOSURE TO WHOLE-BODY VIBRATION IN MILITARY VEHICLES AND EVALUATION BY APPLICATION OF ISO/DIS 2631
Heinrich Dupuis *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 7 p refs

The vibration strain of soldiers and test drivers in military vehicles concerns mainly those reactions which, by the way of influencing the sensation and motoric coordination can decrease the human performance when operating vehicles and carrying out military tasks So especially visual sensation will be influenced by vibration stress Furthermore vibration at high amplitude in certain frequency ranges may lead to injuries to health Results of vibration measurements in 13 wheeled vehicles, 3 tanks and 2 ambulances show that the vibration stress under certain conditions may be very high By the use of national and international standards the measured vibration stress is evaluated As consequences of these results technical improvements and daily exposure time limits are proposed
Author

N75-27688 Surface Effects Ship Project Office Bethesda Md
CREW PERFORMANCE REQUIREMENTS IN THE VIBRATION ENVIRONMENTS OF SURFACE EFFECT SHIPS

Alfred Skolnick *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 22 p refs

Basic requirements and habitability standards are studied for designing surface effect ships employing a self generated cushion of air for lift support with vertical motion centering in the 0 2 to 3 0 Hz region Emphasis is placed on vibratory loads and crew performance Using empirical data from 100-ton testcraft and motion predictions from a 2000-ton SES math model a simulated pilot house is stimulated to portray ship response characteristics at various speeds in diverse sea states Results of these motion simulations and selected critical crew tasks conducted during the tests for up to four hour intervals are discussed
Author

N75-27689 Royal Air Force Inst of Aviation Medicine, Farnborough (England)
THE TRANSMISSION OF ANGULAR ACCELERATION TO THE HEAD IN THE SEATED HUMAN SUBJECT
G R Barnes and B H Rance *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 7 p refs

Sinusoidal angular oscillation in yaw of seated human subjects both restrained and unrestrained has demonstrated that responses of significant amplitude may be elicited in all three head axes In the unrestrained condition, the torso appeared to absorb the input acceleration the response of the head in the yaw axis exhibiting very rapid attenuation and large phase lags at frequencies above 4 Hz In the restrained condition the transmission to the yaw axis of the head was much less severely attenuated with smaller phase lags above 4 Hz The yaw responses in the unrestrained condition exhibited a resonant peak at 2 Hz In both experimental conditions there was a significant response in both the roll and pitch axes of the head The response in pitch exhibited significant 2nd harmonic components which were manifested as a frequency doubling effect between 1 and 6 Hz
Author

N75-27690 Naval Air Development Center Warminster, Pa Air Vehicle Technology Dept
THE EFFECT OF THE INDIVIDUAL AND COMBINED STRESSES OF VIBRATION AND SUSTAINED G ON PILOT PERFORMANCE
A G Piranian *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 13 p refs

The human centrifuge was used to evaluate the relative influences of sustained normal accelerations, combined vertical and lateral buffet loads, and basic aircraft flying qualities on air-to-air tracking performance in air combat maneuvering flight Performing the simulation in an actual F-4B cockpit 11 pilots were tasked with tracking a moving target with a fixed reticle sight presented in visual display Sustained accelerations from 1 3 to 5 0 g s buffet intensity levels from buffet free to + or - 5 g and lateral directional flying qualities were varied independently in several combinations to assess their individual and combined influences on tracking precision Results show that for the buffet frequency used (10 cps) intensities up to + or - 5 g have negligible effects on performance Sustained accelerations up to 5 0 g s have appreciable effects degrading tracking by 10 mils over the 1 0 g level Flying qualities' influences were substantial, and greater than those of either buffet or acceleration Decreased dutch roll frequency and/or damping adverse aileron yaw and proverse aileron yaw were seen to have degrading effects on performance
Author

N75-27691 Deutsche Versuchsanstalt fuer Luft- und Raumfahrt Bad Godesberg (West Germany) Acceleration Physiology Dept
EFFECTS OF TRANSIENT VIBRATIONS ON HUMAN SAFETY AND PERFORMANCE
Lorenz H Vogt *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 10 p refs

Transient vibrations and impact forces represent possible hazards in underground personnel shelters when subjected to pressure waves from nuclear blasts Calculated and simulated acceleration time relationships are compared to safety limits for humans By way of an existing nonlinear model for supine humans the application of a general model for transient and steady state conditions is proposed Performance limits for transient conditions are scarce Some information may be gained by applying the results from steady state experiments to transient conditions
Author

N75-27692 Centre d Essais en Vol Bretigny-sur-Orge (France) Lab de Medecine Aerospatiale
ACTION OF LOW VIBRATION FREQUENCIES ON THE CARDIOVASCULAR SYSTEM OF MAN [ACTION DES VIBRATIONS DE BASSES FREQUENCES SUR LE SYSTEME CARDIO-VASCULAIRE DE L'HOMME]
J Demange R Auffret and B Vettes *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 5 p refs In FRENCH

Cardiac variability in subjects exposed to low frequency mechanical vibrations was studied Vascular response to these vibrations was also measured Particular attention was given to physiological disorders, especially in the case of vibration effects on sick or wounded subjects Measurements were made of circulation and human performance after exposure to the vibrations, some subjects were required to perform complex tasks
Transl by E H W

N75-27693 Kentucky Univ Lexington Wenner-Gren Research Lab
EFFECTS OF VIBRATION STRESS ON THE CAR-

DIOVASCULAR SYSTEM OF ANIMALS
Ernest P McCutcheon *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 13 p refs

Results from a recent series of investigations on the mechanisms and pathways involved in the two major types of physiological responses to mild to moderate levels of vibration exposure are reported The majority of these studies are based on the chronically instrumented animal preparation In addition to representative cardiovascular and mechanical variables many of the studies include hormonal metabolic hematological, and psychological measurements in order to quantify the vibration parameters estimate the overall stress level identify specific response patterns and evaluate the relative dependence of cardiovascular changes on these factors Author

N75-27694 Aerospace Medical Research Labs Wright-Patterson AFB, Ohio
LABORATORY STUDIES ON CHRONIC EFFECTS OF VIBRATION EXPOSURE
D V Sturges, D W Badger (Natl Inst for Occupational Safety and Health, Cincinnati) R N Slarve and D E Wasserman (Natl Inst for Occupational Safety and Health, Cincinnati) *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 2 p refs

Rhesus monkeys were chronically exposed to sinusoidal vibration in the Z axis Gastrointestinal bleeding and lowered hematocrits were noted during exposure Multiple lesions of the gastric mucosa were seen at necropsy The impression is one of early erosive hemorrhaging gastric lesions with subsequent adjustment to the stress and resultant healing of the lesions Author

N75-27695 National Inst for Occupational Safety and Health Cincinnati Ohio
SERUM AND URINE CHANGES IN MACACA MULATTA FOLLOWING PROLONGED EXPOSURE TO 12 Hz, 1 5 g VIBRATION
D W Badger D V Sturges (Aerospace Med Res Lab) R N Slarve (Aerospace Med Res Lab) and D E Wasserman *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 3 p refs

Serum and urine changes in male rhesus monkeys were measured before during and after exposure to 12 Hz 1 5 g vibration 5 hours daily for 130 hours Marked erythrocyte loss occurred in 10 exposed animals within 3 weeks probably as a result of extensive gastrointestinal lesions Serum albumin globulin ratios decreased Similar values for 13 controls were unchanged during this time No evidence of renal impairment was seen since serum creatinine was unchanged and hematuria increased proteinuria and urine sediment morphology were either absent or not changed Author

N75-27696 Centre d Essais en Vol Bretigny-sur-Orge (France) Lab de Medecine Aerospatiale
RAPID FLIGHT VIBRATION PHENOMENA AND SPINE FRACTURES [PHENOMENES VIBRATOIRES RAPIDES EN VOL ET FRACTURES DU RACHIS]
R Auffret R P Delahaye and J Salvagniac *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 5 p refs In FRENCH

Severe vibrations leading to vertebral fractures to pilots of high performance jet aircraft are examined Specifically two cases were studied-sudden intensive accelerations causing ejection from seats, and aircraft malfunctions or sudden movements as caused by turbulence pilot correction procedures, aircraft control, or servomechanism malfunctions Transl by E H W

N75-27697 Army Aeromedical Research Lab Fort Rucker Ala
EFFECTS OF VIBRATION ON THE MUSCULOSKELETAL SYSTEM
Walter M Braunohler *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 7 p refs

No significant change occurs in bone mineral density after short term helicopter flying However, the impact conditions of basic physical training induce 10% demineralization of the distal ulna It is our impression that this is a transient phenomenon Long term follow-up of helicopter pilots flying 6 5 hours/week over two years reveals no evidence of musculoskeletal strain however there appears to be a trend towards demineralization of the distal radius Continued monitoring of this population group is recommended to determine when pathological changes may be expected to occur Author

N75-27698 Royal Air Force Inst of Aviation Medicine Farnborough (England)
THE RESPIRATORY AND METABOLIC EFFECTS OF CONSTANT AMPLITUDE WHOLE-BODY VIBRATION IN MAN
G R Sharp, G A Patrick and W R Withey *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 6 p refs

Nine human subjects were exposed to constant amplitude whole body G sub z vibration for 10 minutes, at frequencies of 2 4, 6, 8 and 10 Hz It was found that at 2 and 4 Hz pulmonary ventilation oxygen uptake, end tidal carbon dioxide tension and heart rate were unchanged At frequencies of 6, 8 and 10 Hz however there was an increase in pulmonary ventilation and in oxygen uptake Pulmonary ventilation was increased in excess of the oxygen uptake resulting in hyperventilation There were no qualitative or quantitative differences in values of pulmonary ventilation or oxygen uptake between subjects when unrestrained and when fully restrained on the vibrator Most subjects experienced discomfort or pain during exposure to frequencies of 6 8 and 10 Hz It is considered that this pain induced the observed hyperventilation The increase in oxygen uptake is thought to be related to the tensing of musculature Author

N75-27699 Southampton Univ (England) Human Factors Research Unit
A STUDY OF VIBRATION, PILOT VISION AND HELICOPTER ACCIDENTS
Michael J Griffin *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 16 p refs

A series of experiments has been conducted to investigate the hypothesis that the occurrence of helicopters flying into wires is associated with vibration having a detrimental effect on pilot visual acuity The research commenced with an investigation of the evidence for the problem by surveying the incidence of wire strikes and determining the conditions in which they occur The second study measured pilot visual acuity during flight in two different helicopter types It was concluded that under normal conditions the loss of visual acuity in these two helicopters was unlikely to be a major cause of wire strikes The third investigation resulted in the detailed specification of the vibration experienced in the Scout AH Mk 1 helicopter Particular emphasis was placed on the changes in vibration with the various flight conditions and the differences between pilots and between aircraft of the same type The final series of experiments were designed to determine the minimum levels of vibration which would affect visual acuity Author

N75-27700 Aerospace Medical Research Labs Wright-Patterson AFB Ohio
MECHANISMS OF VIBRATION EFFECTS ON AIRCREW PERFORMANCE
Richard W Shoenberger *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 9 p refs

The effects of vibration on a variety of human performance tasks are reviewed Research is categorized with respect to the predominant performance requirements of the tasks investigated and results are evaluated in order to determine which aspects of task performance (sensory input, central processing and motor output) are affected by vibration interference This procedure reveals that the vast majority of vibration effects occur for tasks which require fine sensory discrimination or precise motor response or both only a very few studies show effects which can be attributed to interference with intellectual or cognitive

functions On the basis of logical analyses of differential vibration effects on various types of tasks it is suggested that the predominant mechanism for vibration performance effects is direct mechanical interference with functions occurring in the input and output stages of operator performance tasks Vibration effects on tasks which are primarily intellectual in nature and have minimal sensorimotor requirements are discussed in relation to generalized stress mechanisms Recent research is described in which analytical decomposition of reaction time measures made it possible to definitively isolate vibration effects on peripheral and central performance functions within a single task Author

N75-27701 Dayton Univ Research Inst Ohio
PERFORMANCE AND PHYSIOLOGICAL EFFECTS OF COMBINED STRESS INCLUDING VIBRATION
J C Guignard *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 6 p refs

Whole body vibration affects human task performance by two main mechanisms peripherally by mechanical interference at the point of contact between the man and his task and centrally, by burdening the brain with irrelevant sensory information In the latter regard the action of vibration is in some ways akin to that of noise Any particular effect of vibration on performance depends on many factors including the physical characteristics of the vibration the nature of the task and the skill and motivation of the performer time and the presence of other stressful agents or circumstances Unfortunately our ignorance of the psychophysiological mechanisms by which vibration degrades particular kinds of task performance is still profound and our knowledge for the most part qualitative in nature That is mainly because much laboratory based research into the psychophysiological actions of vibration suffers from the lack of an appropriate standardized methodology and of complete and proper measurements of the vibratory forces affecting the man at the time when his performance is being evaluated Author

N75-27702 Medical Research Council, Cambridge (England)
EFFECTS OF DURATION OF VERTICAL VIBRATION BEYOND THE PROPOSED ISO "FATIGUE-DECREASED PROFICIENCY" TIME, ON THE PERFORMANCE OF VARIOUS TASKS
R T Wilkinson and R Gray (RAE Farnborough England) *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 5 p refs

Six subjects carried out four 3-hour sessions of performance tasks two with continuous 5 Hz, 1 2 m/s squared rms vertical vibration and two under static conditions There was no general support for a prediction from the proposed ISO curves of fatigue-decreased proficiency (FDP) that vibration can lower proficiency as a function of duration of exposure However vibration associated with a 1-hour vigilance task and knowledge of results decreased proficiency towards the end of the 3-hour work period Author

N75-27703 Advisory Group for Aeronautical Research and Development, Paris (France)
PERIPHERAL VISION ARTIFICIAL HORIZON DISPLAY

R Malcolm K E Money, and P Anderson *In its* Vibration and Combined Stresses in Advan Systems Mar 1975 3 p ref

The artificial horizon instrument currently used in aircraft suffers from two shortcomings, the pilot cannot obtain continuous information from it since he must also look at other instruments and second, during episodes of heavy vibration, turbulence or disorientation, a small instrument becomes extremely difficult to read This paper describes a device which projects a line or bar of light from beside the pilot's head forward onto the instrument panel The line is approximately one to four inches wide and subtends 160 - 170 deg of arc from the pilot's head, so that it extends well into his peripheral vision The light source is driven by servomotors which are controlled from the aircraft's inertial gyros such that the bar of light seen by the pilot duplicates the pitch and roll motions of the real horizon outside the cockpit The advantages of this display are visibility during turbulence and vibration visibility while looking at other instruments and reduction of the pilot s workload by making use of the neural programming which naturally orients us with the horizon Author

N75-27704 Federal Inst for Occupational Safety and Accident Research Dortmund (West Germany)
A REVIEW OF BIOMECHANICAL MODELS FOR THE EVALUATION OF VIBRATION STRESS
Wolfgang Lange *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 8 p refs

Physical resonances of the human body or of its parts under vibration correlate with subjective responses Biodynamic models can be calculated from data of vibration investigations Several such models are discussed The models differ in their degrees of freedom in their mass elasticity and damper elements and in the way these elements are coupled A further important parameter is the linearity or nonlinearity of the model For the evaluation of vibratory stress it is necessary to establish physiological and/or psychological criteria which correlate with biomechanical responses that can be simulated by models Several methods for evaluating vibration stress are discussed and compared Author

N75-27705* National Aeronautics and Space Administration Langley Research Center, Langley Station Va
AN ELEMENTARY PSYCHOPHYSICAL MODEL TO PREDICT RIDE COMFORT IN THE COMBINED STRESS OF MULTIPLE DEGREES OF FREEDOM
Ralph W Stone Jr *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 7 p refs

The quality of airplane rides probably will become increasingly important to passengers particularly in terminal area operations and on short haul trips The development of models to predict ride comfort is considered An elementary model concept is presented herein and compared with subjective ride comfort response ratings measured on actual scheduled airline flights and simulated flights Author

N75-27706 Kentucky Univ Lexington
MODELS OF THE CARDIOVASCULAR SYSTEM UNDER WHOLE BODY VIBRATION STRESS
Charles F Knapp *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 13 p refs

Five major mechanisms can be listed as the main factors responsible for producing alterations in the circulatory system exposed to vibration The mechanisms important for vibration stress of a given waveform frequency displacement acceleration transmitted force axis and duration are (1) reaction of the fluid and vessel system (2) reaction of large body organ systems and the musculoskeletal system (3) reaction of the mechanoreceptors (4) reaction of the hormonal metabolic and hematological systems and (5) reaction modification through the central nervous system and the psychophysiological pathways Analytical efforts are reviewed as they relate to the five mechanisms listed above and current efforts in modeling the hydrodynamic aspects of the cardiovascular system are discussed in order to estimate its relative contribution to the total changes in arterial pressures and flows measured in animals exposed to whole body sinusoidal vibration Author

N75-27707 Systems Technology Inc Hawthorne Calif
EVALUATING BIODYNAMIC INTERFERENCE WITH OPERATIONAL CREWS
Henry R Jex and R Wade Allen *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 18 p refs

A review is made of operational situations in which biodynamic interference with aircrews is a problem and it is shown that there is a large contrast between the information needed to evaluate these problems in operational situations versus that available from existing laboratory research A structure and means

for extrapolating the large and growing empirical data base is discussed Some progress in work along these lines is presented including Systems performance models for interrelating the many variables refined biomechanical models for analyzing vibration feedthrough to controls in closed loop manual tasks and procedures for including habitability or ride ratings in the overall evaluations Author

N75-27708 Advisory Group for Aeronautical Research and Development Paris (France)
THE ISO GUIDE FOR THE EVALUATION OF HUMAN WHOLE BODY VIBRATION EXPOSURE
G Bobbert *In its* Vibration and Combined Stresses in Advan Systems Mar 1975 6 p refs

It exists a demand for regulations to evaluate the vibration exposure of human beings Although the knowledge of the human reaction is not sufficient for all cases of vibration exposure experts from ten countries discussed a standard which gives a guide for the evaluation As this standard is agreed by the ISO-Council and it is now going to be printed the background of this standard and the most important details are reported Author

N75-27709 Royal Aircraft Establishment Farnborough (England) Human Engineering Div
PROPOSED LIMITS FOR EXPOSURE TO WHOLE BODY VERTICAL VIBRATION, 0 1 TO 1 0 Hz
Geoff Allen *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 11 p refs

The need for design standards for civil and military vehicles to cover human reaction to vibration below 1 Hz is outlined Limits are proposed against two criteria the first to prevent severe discomfort merges at 1 Hz with the DIS2631 exposure limit, the second to prevent reduced comfort merges at 1 Hz with the DIS2631 reduced comfort boundary Because of lack of information, limits have been given for 25 minute and 8 hour durations only and it has not been possible to suggest values for the preservation of working efficiency The information on which the proposals are based is outlined namely some twenty laboratory and field investigations and critical reviews yielding about fifty data points Considering the approximate nature of some of the information it is relatively consistent, and reinforces previous assertions that the critical frequency range for motion sickness is below 0 5 Hz Author

N75-27710 Boeing Co Wichita Kans
RIDE QUALITY OF CREW MANNED MILITARY AIRCRAFT

Stanley H Brumaghim *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 7 p refs

Ride quality criteria are compared in terms of both short term and extended term crew performance decrement thresholds Flight test data are included which illustrate the capability to modify aircraft response to gusts through ride control systems Requirements to strengthen application of existing criteria to design of airplane ride control systems are given Chief among these areas are the need for improved ability to handle human response to frequencies of vibration below 1 0 Hz and in validation of thresholds for extended exposure to vibration Test data are also discussed which show the need to consider impact of ride environment on time to complete crew tasks in addition to the more frequent concern with impact on performance errors Author

N75-27711 Centre de Recherches de Medecine Aeronautique, Paris (France)
STUDY OF MAN'S PHYSIOLOGICAL RESPONSE TO EXPOSURE TO INFRA-SOUND LEVELS OF 130 dB [ETUDE CHEZ L'HOMME DES EFFETS PHYSIOLOGIQUES D'UNE EXPOSITION A DES NIVEAUX INFR-SONORES DE 130 DB]
P Borredon J Nathie and A Gibert *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 13 p refs In FRENCH

Infrasound effects on the physiological functions of man after a 50 minute exposure period were investigated Special efforts were made to observe circulatory reactions and summarize totally the action of aerial infrasonic vibrations Measurements were made of time response to a luminous solicitation cardiac frequency and maximum and minimum arterial pressure An audiogram was made of the aerial luminary tones Detailed results are given in tabular form Transl by E H W

N75-27712 Centre de Recherches de Medecine Aeronautique Paris (France)
EFFECT OF LOW FREQUENCY AERIAL VIBRATIONS ON NOCTURNAL ACTIVITY OF A RAT [EFFET D'UNE EXPOSITION A DES VIBRATIONS AERIENNES DE BASSE FREQUENCE SUR L'ACTIVITE NOCTURNE DU RAT]
P Pesques and J Nathie *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 4 p refs In FRENCH

Observations were made of rat nocturnal activity after exposure to general aerial vibrations The rats were exposed for eight hours to sinusoidal vibrations at a pressure of 147 dB and at frequencies of 8 16 and 32 Hz Results indicate the vibrations were not loud enough to severely influence nighttime activity, however some increases and decreases were noted depending on exposure level Transl by E H W

N75-27713 Erlangen-Nuremberg Univ (West Germany)
VIBRATESE LANGUAGE
Wolf D Keidel *In* AGARD Vibration and Combined Stresses in Advan Systems Mar 1975 9 p refs

A brief review of the work done to develop vibratese languages is given A special type of vibratese language is described using the v Bekesy model of the cochlea Here the frequency range of speech is adapted to that of the vibrotactile system without changing the time domain so that the speech communication by means of a mechanical stimulation of the skin of the human forearm can be performed in real time A highly sophisticated computer program for the LINC 8 or PDP 12 has been written for this purpose Author

N75-27714*# Scientific Translation Service Santa Barbara Calif
ON THE DIRECTED MONITORING OF STERILIZATION
M Schreiber and F Hajduk Washington NASA Jul 1975 9 p refs Transl into ENGLISH from Deut Gesundheitswesen (East Germany) v 30 no 17 1975 p 811-813
(Contract NASw-2483)
(NASA-TT-F-16459) Avail NTIS HC $3 25 CSCL 06M

The magnitude and the causes of failures in sterilization are evaluated and the effectiveness of an additional indicator to strengthen sterilization monitoring is tested The spore-earth test is evaluated for the hot air and steam sterilization separately for the period from 1971 to 1973 A glucose-plasma indicator is shown to increase the effectiveness of the biological control when used in conjunction with the standard spore-earth test Author

N75-27715*# Kanner (Leo) Associates Redwood City Calif
Ca SALTS OF THE SACCUS ENDOLYMPHATICUS AND PROCESSES OF CALCIFICATION OF BONES DURING NORMAL AND EXPERIMENTAL METAMORPHOSIS IN TADPOLES OF BUFO VULGARIS, RANA DALMATINA AND RANA ESCULENTA
A Guardabassi Washington NASA Jul 1975 33 p refs Transl into ENGLISH from Arch Anat Microscop Morphol Exp (France) v 41, no 2 1952 p 143-167
(Contract NASw-2790)
(NASA-TT-F-16472) Avail NTIS HC $3 75 CSCL 06C

The feeding of tadpoles with thymus was found to have no significant effect on the size of the animals the development of the saccus endolymphaticus its Ca salt content or bone calcification Experiments on exposure to thyroxine seem to indicate that the calcium salts in the saccus endolymphaticus can gradually be mobilized during normal metamorphosis to compensate for any calcium deficiency in the surrounding medium a finding partly indicated by the fact that the metamorphosis of

the tadpoles exposed to thyroxine was accelerated and the bones were unable to calcify completely Author

N75-27716*# Kanner (Leo) Associates Redwood City Calif
DEGRADATION OF MITOCHONDRIA IN YEAST INDUCED BY ANAEROBIOSIS AT DIFFERENT GROWTH PHASES
V N Luzikov Ye I Raynina and A S Zubatov Washington NASA Jul 1975 11 p refs Transl into ENGLISH from Tsitologiya (USSR) v 17 no 3 1975 p 337-342
(Contract NASw-2481)
(NASA-TT-F-16458) Avail NTIS HC $3 25 CSCL 06M

Prolonged anaeroboisis was studied which leads to degenerative changes in the mitochondria of Saccharomyces cerevisiae yeasts These are manifested by the decline in the activity of several respiratory enzymes and the degradation of their structure as revealed by electron microscope monitoring of the cells The degree of mitochondrial degradation occurring in the yeasts under anaerobic conditions depends on the culture s stage of growth The cell mitochondria are most labile in the beginning of the logarithmic phase The possible causes and mechanisms of mitochondrial degradation are discussed Author

N75-27717*# Mississippi Valley State Univ Itta Bena
BIOLOGICAL INDICATORS FOR MONITORING WATER QUALITY OF MTF CANALS SYSTEM Semiannual Status Report, 26 Apr 1974 - 25 Apr 1975
S L Sethi 25 Apr 1975 16 p refs
(Grant NsG-8009)
(NASA-CR-143178) Avail NTIS HC $3 25 CSCL 06B

Biological models, diversity indexes were developed to predict environmental effects of NASA s Mississippi test facility (MTF) chemical operations on canal systems in the area To predict the effects on local streams a physical model of unpolluted streams was established The model is fed by artesian well water free of background levels of pollutants The species diversity and biota composition of unpolluted MTF stream was determined resulting information will be used to form baseline data for future comparisons Biological modeling was accomplished by adding controlled quantities or kinds of chemical pollutants and evaluating the effects of these chemicals on the biological life of the stream Author

N75-27718# Armed Forces Radiobiology Research Inst Bethesda Md
CEREBRAL TEMPERATURE CHANGES IN THE MONKEY (MACACA MULATTA) AFTER 2500 RADS IONIZING RADIATION
W L McFarland and J A Willis Apr 1974 15 p refs
(DNA Proj MWED-QAXMA905)
(AD-A004854 AFRRI-SR-74-7) Avail NTIS CSCL 06/18

To determine the temperature response of the brain to radiation thermistor temperature sensing probes were implanted into thalamic and cortical areas of eight monkeys and the arch of the aorta After securing base-line temperature recordings the monkeys were exposed to 2500 rads whole-body pulsed mixed gamma-neutron radiation in the AFRRI-TRIGA reactor Temperature at all measured sites generally dropped briefly immediately after the pulse then rose and stayed elevated 1-2C for the remainder of the 3-1/2-hour observation period There did not appear to be any regional differences in brain temperature response and brain temperature followed core (aortic) temperature changes GRA

N75-27719# Armed Forces Radiobiology Research Inst Bethesda Md
TEMPORAL CHANGE IN RADIOSENSITIVITY OF MINIATURE SWINE AS EVALUATED BY THE SPLIT-DOSE TECHNIQUE
J F Taylor J L Terry M E Ekstrom and J E West Jul 1974 26 p refs
(DNA Proj NWED-QAXMC903)
(AD-A004597 AFRRI-SR-74-14) Avail NTIS CSCL 06/18

Using the split-dose technique recovery was measured in miniature swine exposed to whole-body 60Co gamma radiation delivered at 34-35 rads/minute The initial conditioning dose (150 rads) was approximately two-thirds of the normal LD50/30 (237 rads) The redetermined or challenge LD50/30 measured 28 days after the conditioning dose was 477 rads, indicating 260 percent recovery from the initial sublethal dose Histopathological examinations of three animals euthanatized 28 days after 150 rads revealed no histologic evidence that could account for the radioresistant state at that time GRA

N75-27720# Franklin Inst Research Labs Philadelphia, Pa Science Information Sciences Dept
STRUCTURE-ACTIVITY CORRELATION BIBLIOGRAPHY, WITH SUBJECT AND AUTHOR INDEX Interim Report
Frank D Kover Mar 1975 74 p refs
(Contract EPA-68-01-2657)
(PB-240658/5, EPA-560/1-75-001) Avail NTIS HC $4 25 CSCL 06T

References are provided to the literature on two principle methods of chemical structure-biological activity correlation which employ multiple regression, the multiple parameter approach (Hansch) and the additive model (Free-Wilson) Papers employing factor analysis discriminant analysis pattern recognition, and cluster analysis to correlate chemical structure to biological activity are cited As these techniques and new ones are published in the literature, they are being included in the compilation This edition of the bibliography covers the literature to November 1974 GRA

N75-27721 Wisconsin Univ Madison
THERMOCURRENT DOSIMETRY WITH HIGH PURITY ALUMINUM OXIDE Ph D Thesis
Gary Dodson Fullerton 1974 145 p
Avail Univ Microfilms Order No 75-9971

The application of thermocurrent (TC) to ionizing radiation dosimetry was studied It was shown that TC in alumina has properties that are suited to personnel dosimetry and environmental monitoring The TC dosimeters were made from thin disks of alumina Aluminum electrodes were evaporated on each side on one face a high voltage electrode and on the opposite face a measuring electrode encircled by a guard ring Exposure to ionizing radiation resulted in stored electrons and holes in metastable trapping sites The signal was read-out by heating the dosimeter with a voltage source and picoammeter connected in series between the opposite electrodes The thermally remobilized charge caused a transient TC The thermogram TC versus time or temperature is similar to a TL glow curve Either the peak current or the integrated current is a measure of absorbed dose Dissert Abstr

N75-27722 Pennsylvania Univ Philadelphia
DEVELOPMENTAL PROGRAMMING FOR RETINOTECTAL PATTERNS Ph D Thesis
Richard Kevin Hunt 1974 100 p
Avail Univ Microfilms Order No 75-14573

Embryonic development of the retinal axes was studied It was found that before a certain stage these axes may be realigned but then they are irreversibly specified as the permanent reference axes for retionotectal mapping Axial specification is triggered by the eye itself When eye cell differentiation was blocked by the thymidine analog 5-bromodeoxyuridine the time of specification was shown to correlate with the onset of cytologic differentiation of the ganglion cells in the central optic cup These results indicate that the control mechanisms for axial specification are localized in the gangliogenic precursor cells in the neuroepithelium and are activated as a lineage-dependent differentiative event In earlier embryonic stages the capacity to undergo axial replacement is an advantage enabling the eye to compensate for spontaneous misalignments or distortions of the retinal axes Later the specified permanent axes make possible a fixed plan for position-dependent differentiation of the ganglion cells Dissert Abstr

N75-27723 Colorado State Univ, Fort Collins
THE EFFECT OF HYPOXIA ON THE PULMONARY CAPILLARIES Ph D Thesis
Wiltz Walter Wagner Jr 1974 77 p
Avail Univ Microfilms Order No 75-14682

To facilitate study of the effect of hypoxia on pulmonary capillaries, windows were inserted in the chest wall of nine dogs The total length of all perfused capillaries in the field of observation was then determined for various arterial oxygen tensions Total perfused capillary length was nearly constant between arterial oxygen tensions of 160 and 70 torr As the tension fell below 70 torr, recruitment of previously unperfused capillaries occurred, at 40 torr, the total length of perfused capillaries was about four times greater than during normoxia There was no correlation between the recruitment of capillaries and alterations in left atrial pressure, only a weak correlation with cardiac output changes, but a very strong correlation with increased pulmonary artery pressure This implies that recruitment is caused by constriction within the lung This response increases the surface area for gas exchange and therefore could be advantageous during airway hypoxia Dissert Abstr

N75-27725# Technische Universitaet Munich (West Germany)
A MULTI-FACTORIAL DESIGN OF COMPUTER SUPPORTED RESEARCH OF HUMAN SLEEP UNDER THE INFLUENCE OF VARIOUS THERMAL CONDITIONS Ph D Thesis [EINE MULTIFAKTORIELLE ANORDNUNG ZUR RECHNERGESTUETZTEN UNTERSUCHUNG DES MENSCHLICHEN SCHLAFS UNTER DEM EINFLUSS UNTERSCHIEDLICHER THERMISCHER UMGEBUNGEN]
Peter Riebling 11 Jul 1974 247 p refs In GERMAN
Avail NTIS HC $7 50 CSCL 06S

The influence of environmental temperature on physiological loads to sleeping men are studied by evaluating sleep motor movements moisture loss skin temperature measurements and multiple temperature measurements on matress surface An enviromental temperature of 25 C and 70 percent air humidity increases significantly evaporation of the human body and matress temperature A correlation between pressure distribution of the human body with matress surface properties and sleep movements is postulated Transl by G G

N75-27726# Technische Universitaet Munich (West Germany)
ON THE CLASSIFICATION OF MULTIVARIATE TIME DEPENDENT PATTERNS IN VIEW OF THEIR PROCESS STRUCTURE Ph D Thesis [ZUR KLASSIFIKATION MULTIVARIATER, ZEITABHAENGIGER MUSTER IM HINBLICK AUF IHRE PROZESSSTRUKTUR]
Siegfried Poeppl 1974 266 p refs In GERMAN
Avail NTIS HC $8 50

The most important part of a classification system is optimal feature extraction A system for automatic evaluation of sleep EEG s is developed that includes a zero ranging procedure a transformation matrix and an Euclidean classifier process Automatic classification results agree with visual classifications even if patterns are time dependent and their realization is multivariable Transl by G G

N75-27727# Technische Universitaet Munich (West Germany)
STUDY OF HYDROMECHANICAL MODELS OF THE INNER EAR WITH ILLUSTRATION OF BASILAR MEMBRANE, CORTI-ORGAN, AND COVERING MEMBRANE Ph D Thesis [BEOBACHTUNGEN AN HYDROMECHANISCHEN MODELLEN DES INNENOHRES MIT NACHBILDUNG VON BASILARM CORTI-ORGAN UND DECKMEMBRAN]
Roland Helle 20 May 1974 151 p refs In GERMAN
Avail NTIS HC $6 25

Relative motion and fluid flow effects in hydromechanical oscillations of the cochlea are studied in order to develop a mechanism of selective augmentation for the inner ear It is shown that the gap width between corti organ and covering membrane determines cochlear hydrodynamics and thus effects stirrup inclination as well as basilar membrane and covering membrane oscillations as function of frequency Transl by G G

N75-27728*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston, Tex
PROCEEDINGS OF THE 1973 LYNDON B JOHNSON SPACE CENTER ENDOCRINE PROGRAM CONFERENCE
Jun 1975 187 p refs Conf held at Houston Tex
(NASA-TM-X-58155, JSC-09668) Avail NTIS HC $7 00 CSCL 06P

Papers given at the conference are presented Subjects covered include the following biochemical changes during 28 days of space flight modulating the pituitary-adrenal response to stress the significance of biorhythms in space flight, the importance of the rein-angiotensin system in normal cardiovascular homeostasis a progress report of stress-induced changes in corticosteroid metabolism, recent studies of physiological factors involved in the regulation of serotonin content and turnover in the brain, the role of brain biogenic amines in the control of pituitary-adrenocortical activity, application of the water immersion model to man by studies of acid-base homeostasis during simulated weightlessness, the present status of physiological studies and analysis of calcium homeostasis in the Apollo and Skylab programs, and endocrine considerations in the red-cell-mass and plasma-volume changes of Skylab 2 and 3 crews

N75-27729* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex
BIOCHEMICAL OBSERVATION DURING 28 DAYS OF SPACE FLIGHT
Carolyn S Leach and Paul C Kambaut *In its* Proc of the 1973 JSC Endocrine Program Conf Jun 1975 38 p refs

CSCL 06A

With the completion of the 28-day flight of Skylab 2, the sum of biochemical data on human reaction to the weightless environment was significantly extended both quantitatively and qualitatively The biochemical studies were divided into two broad categories One group included the more routine blood studies similar to those used in everyday medical practice The second category encompassed those analyses used to investigate more thoroughly the endocrinological and fluid changes first seen in the crewmembers following the Gemini Apollo and Soviet missions Significant biochemical changes were observed that varied in magnitude and direction, but all disappeared shortly after return to earth Most of changes indicate successful adaptation by the body to the combined stresses of weightlessness Results of the biochemical observation are presented in the form of data tables and graphs Author

N75-27730* National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
MODULATING THE PITUITARY-ADRENAL RESPONSE TO STRESS
Joan Vernikos-Danellis *In its* Proc of the 1973 JSC Endocrine Program Conf Jun 1975 10 p refs

CSCL 06S

Serotonin is believed to be a transmitter or regulator of neuronal function A possible relationship between the pituitary-adrenal secretion of steroids and brain serotonin in the rat was investigated by evaluating the effects of altering brain 5-hydroxy tryptamine (HT) levels on the daily fluctuation of plasma corticosterone and on the response of the pituitary-adrenal system to a stressful or noxious stimulus in the rat The approach was either to inhibit brain 5-HT synthesis with para-chlorophenyl alanine or to raise its level with precursors such as tryptophan or 5-hydroxy tryptophan Author

N75-27731* National Aeronautics and Space Administration Ames Research Center Moffett Field, Calif
SIGNIFICANCE OF BIORHYTHMS IN SPACE FLIGHT
Charles M Winget *In its* Proc of the 1973 JSC Endocrine Program Conf Jun 1975 11 p refs

CSCL 06P

Evidence is presented that the most important factor in the maintenance of optimal health and performance is the stability of the relationship of one body rhythm to another The effect of social interaction on performance well-being and physiological rhythm synchrony was investigated Three groups of healthy males, ages 21 to 25, were confined in rooms (3 4 by 5 2 meters (11

by 17 feet)) for a total period of 105 days Two of the groups were in rooms in which the environment could be regulated The third group served as the control group and was exposed to ambient experimental conditions The confined subjects were exposed for periods to several days either to 16 hours of light and 8 hours of dark or to continuous light at a light intensity of 161 lm/sq m (15 foot-candles) The confined subjects were deprived of all time cues and meals were ad libitum The subjects were observed throughout the study by a video camera and were scored for activity Communications were limited to meal and sample-collection information, and meals and samples were passed through a two-way hatch Rectal temperature and heart rate (HR) were sampled every 30 minutes by telemetry throughout the study Results are presented Author

N75-27732* Harvard Univ Cambridge Mass Medical School
THE IMPORTANCE OF THE RENIN-ANGIOTENSIN SYSTEM IN NORMAL CARDIOVASCULAR HOMEOSTASIS
Edgar Haber *In* NASA Johnson Space Center Proc of the 1973 JSC Endocrine Program Conf Jun 1975 8 p refs

CSCL 06P

Studies were carried out on adult mongrel dogs (20 to 30 kilograms) to investigate the importance of the renin-angiotensin system Results indicate that the renin-angiotensin system plays a major role in the maintenance of circulatory homeostasis when extracellular fluid volume is depleted It was also found that angiotensin II concentration, in addition to renal perfusion pressure is a factor in the regulation of renin release M J S

N75-27733* Baylor Univ, Houston, Tex Dept of Physiology
STRESS-INDUCED CHANGES IN CORTICOSTEROID METABOLISM Progress Report
Martha M Tacker *In* NASA Johnson Space Center Proc of the 1973 JSC Endocrine Program Conf Jun 1975 10 p refs

CSCL 06S

Because plasma and urine corticosteroid concentrations are influenced by several factors in addition to adrenal cortex secretion the effect of stress on all of these factors was determined in order to interpret the plasma and urine concentrations Progress on the investigation is reported M J S

N75-27734* Texas Univ San Antonio Dept of Anatomy
RECENT STUDIES OF PHYSIOLOGICAL FACTORS INVOLVED IN THE REGULATION OF SEROTONIN CONTENT AND TURNOVER IN THE BRAIN
William W Morgan *In* NASA Johnson Space Center Proc of the 1973 JSC Endocrine Program Conf Jun 1975 46 p refs
CSCL 06P

The results of investigations of the physiological role of serotonin (5-Ht) in the brain are discussed Experiments are described in detail and results presented in tabular and graphical form M J S

N75-27735* Indiana Univ, Bloomington
THE ROLE OF BRAIN BIOGENIC AMINES IN THE CONTROL OF PITUITARY-ADRENOCORTICAL ACTIVITY
Roger P Maickel *In* NASA Johnson Space Center Proc of the 1973 JSC Endocrine Program Conf Jun 1975 10 p refs

CSCL 06P

It was found that pretreatment of animals with desmethyl imipramine antagonized the reserpine-induced sedation without preventing the decline in brain amines or the hypersecretion of adrenocorticotropic hormone (ACTH) The antagonism of reserpine-induced ACTH hypersecretion by the monoamine oxidose (MAO) inhibitor pargyline (MO 911, N-methyl-N-benzyl-2-propynylamine) was studied Evidence is presented that this antagonism is related to the level of brain biogenic amines maintained during the course of action of the drug Pretreatment with MAO inhibitors does not affect the ACTH hypersecretion evoked by exposure to cold or chlorpromazine lending further support to the hypothesis that reserpine-induced ACTH hypersecretion is related to brain amine changes Author

N75-27736* Miami Univ Fla School of Medicine
STUDIES OF ACID-BASE HOMEOSTASIS DURING SIMULATED WEIGHTLESSNESS APPLICATION OF THE WATER IMMERSION MODEL TO MAN
Murray Epstein *In* NASA Johnson Space Center Proc of the 1973 JSC Endocrine Program Conf Jun 1975 11 p refs

CSCL 06S

The effects of water immersion on acid-base homeostasis were investigated under carefully controlled conditions Studies of renal acidification were carried out on seven healthy male subjects each consuming a diet containing 150 meq sodium and 100 meq potassium Control and immersion studies were carried out on each subject on the fourth and sixth days respectively of dietary equilibration by which time all subjects had achieved sodium balance The experimental protocols on study days were similar (except for the amount of water administered) Author

N75-27737* Massachusetts General Hospital Boston Endocrine Unit
PARATHYROID HORMONE, CALCITONIN, AND VITAMIN D 1974 PRESENT STATUS OF PHYSIOLOGICAL STUDIES AND ANALYSIS OF CALCIUM HOMEOSTASIS
John T Potts Jr and K G Swenson *In* NASA Johnson Space Center Proc of the 1973 JSC Endocrine Program Conf Jun 1975 27 p refs
CSCL 06P

The role of parathyroid hormone calcitonin and vitamin D in the control of calcium and bone metabolism was studied Particular emphasis was placed on the physiological adaptation to weightlessness and as a potential model for this purpose, on the immobilization characteristic of space flight or prolonged bed rest The biosynthesis control of secretion, and metabolism of these hormonal agents is considered Author

N75-27738* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex
ENDOCRINE CONSIDERATIONS IN THE RED-CELL-MASS AND PLASMA VOLUME CHANGES OF THE SKYLAB 2 AND 3 CREWS
Philip C Johnson (Baylor Coll of Med Houston Tex) Carolyn S Leach and Theda Driscoll (Baylor Coll of Med Houston Tex) *In its* Proc of the 1973 JSC Endocrine Program Conf Jun 1975 9 p refs
CSCL 06S

The effect of unknown endocrine changes on blood volume of crewmembers was investigated The results are presented in tabular form The fact that some of the changes were in the wrong direction suggests that changes in endocrine function were not the primary cause of the decreases in the plasma volume and red cell mass M J S

N75-27739*# Scientific Translation Service, Santa Barbara Calif
THE PROPHYLACTIC EFFECT OF HEAD-COOLING ON COAL MINER'S CRAMPS REPORT 2 THE EFFECT OF HEAD-COOLING ON COAL MINERS UNDER HOT AND HUMID ENVIRONMENT
Tsuneo Shiratori Kazuo Sasaki, Yoshihiko Suzuki, Yoshihisa Ito, and Isaoshi Saito Washington NASA Jul 1975 16 p refs Transl into ENGLISH from Tohoku Ishi (Japan) v 66 no 2 1963 p 266-271
(Contract NASw-2483)
(NASA-TT-F-16449) Avail NTIS HC $3 25 CSCL 06E

An examination was conducted of to 12 individuals who had been subjected to head-cooling in the hot and humid environment of the Joban coal mine to determine their body temperature pulse, respiration, blood pressure rate of perspiration, blood gravity blood capacity blood count, plasma protein and urine The results are discussed Author

N75-27740*# Scientific Translation Service, Santa Barbara Calif
THE COMPOSITION OF URINE AND FECES IN HEALTHY SUBJECTS

V G Vysotskiy T F Vlasova, A N Kochetkova, A S Ushakov and S K Shishkina Washington NASA Jul 1975 8 p refs Transl into ENGLISH from Vop Pitan (USSR) no 6, Nov - Dec 1974 p 35-38
(Contract NASw-2483)
(NASA-TT-F-16420) Avail NTIS HC $3 25 CSCL 06P

The data on the urine and fecal composition were determined and processed statistically for young healthy male examinees The experiments were conducted under controlled conditions with the maintenance of standard diet It was found that for the given category of people the normal values of the component parts of both urine and feces will fluctuate Author

N75-27741*# California Univ La Jolla Dept of Neurosciences
CLINICAL APPLICATIONS OF THE HUMAN BRAINSTEM RESPONSES TO AUDITORY STIMULI
Robert Galambos and Kurt Hecox [1975] 19 p refs Presented at the Proc of the Brussels Conf , 1974
(Grants NGR-05-009-198 NS-10482)
(NASA-CR-143134) Avail NTIS HC $3 25 CSCL 06P

A technique utilizing the frequency following response (FFR) (obtained by auditory stimulation, whereby the stimulus frequency and duration are mirror-imaged in the resulting brainwaves) as a clinical tool for hearing disorders in humans of all ages is presented Various medical studies are discussed to support the clinical value of the technique The discovery and origin of the FFR and another significant brainstem auditory response involved in studying the eighth nerve is also discussed J R T

N75-27742*# California Univ La Jolla Dept of Neurosciences
THE AUDITORY NEURAL NETWORK IN MAN
Robert Galambos [1975] 24 p refs
(Grants NGR-05-009-198, NS-10482)
(NASA-CR-143135) Avail NTIS HC $3 25 CSCL 06P

The principles of anatomy and physiology necessary for understanding brain wave recordings made from the scalp of normal people are briefly discussed Brain waves evoked by sounds are described and certain of their features are related to the physical aspects of the stimulus and to the psychological state of the listener The position is taken that data obtained through scalp probes can reveal a large amount of detail about brain functioning and that analysis of such records enable detection of the response of the nervous system to an acoustic message at the moment of its inception and to the progress of the message through the brain Brain events responsible for distinguishing between similar signals and making decisions about them appear to generate characteristic and identifiable electrical waves Some theoretical speculation about these data are introduced with the aim of generating a more heuristic model of the functioning brain Author

N75-27743*# California Univ , La Jolla Dept of Neurosciences
ELECTROPHYSIOLOGICAL MEASUREMENT OF HUMAN AUDITORY FUNCTION
Robert Galambos [1975] 26 p refs Sponsored by NASA and NIH
(NASA-CR-143136) Avail NTIS HC $3 75 CSCL 06P

Knowledge of the human auditory evoked response is reviewed including methods of determining this response, the way particular changes in the stimulus are coupled to specific changes in the response, and how the state of mind of the listener will influence the response Important practical applications of this basic knowledge are discussed Measurement of the brainstem evoked response for instance can state unequivocally how well the peripheral auditory apparatus functions It might then be developed into a useful hearing test, especially for infants and preverbal or nonverbal children Clinical applications of measuring the brain waves evoked 100 msec and later after the auditory stimulus are undetermined These waves are clearly related to brain events associated with cognitive processing of acoustic signals, since their properties depend upon where the listener directs his attention and whether how long he expects the signal Author

N75-27744*# California Univ La Jolla Dept of Neuroscience
ON HEMISPHERIC DIFFERENCES IN EVOKED POTENTIALS TO SPEECH STIMULI
Robert Galambos, Peter Benson, Timothy S Smith, Carol Schulman-Galambos, and Helen Osier [1975] 11 p refs
(Grants NGR-05-009-198 HD-08694 NS-11735)
(NASA-CR-143137) Avail NTIS HC $3 25 CSCL 06P

Confirmation is provided for the belief that evoked potentials may reflect differences in hemispheric functioning that are marginal at best Subjects were right-handed and audiologically normal men and women, and responses were recorded using standard EEG techniques Subjects were instructed to listen for the targets while laying in a darkened sound booth Different stimuli speech and tone signals were used Speech sounds were shown to evoke a response pattern that resembles that to tone or clicks Analysis of variances on peak amplitude and latency measures showed no significant differences between hemispheres however, a Wilcoxon test showed significant differences in hemispheres for certain target tasks Author

N75-27745*# California Univ La Jolla Dept of Neurosciences
STIMULUS NOVELTY, TASK RELEVANCE AND THE VISUAL EVOKED POTENTIAL IN MAN
Eric Courchesne Steven A Hillyard, and Robert Galambos [1975] 37 p refs
(Grants NGR-05-009-198)
(NASA-CR-143139) Avail NTIS HC $3 75 CSCL 06P

The effect of task relevance on P3 (waveform of human evoked potential) waves and the methodologies used to deal with them are outlined Visual evoked potentials (VEPs) were recorded from normal adult subjects performing in a visual discrimination task Subjects counted the number of presentations of the numeral 4 which was interposed rarely and randomly within a sequence of tachistoscopically flashed background stimuli Intrusive, task-irrelevant (not counted) stimuli were also interspersed rarely and randomly in the sequence of 2s these stimuli were of two types similes which were easily recognizable, and novels, which were completely unrecognizable It was found that the similes and the counted 4s evoked posteriorly distributed P3 waves while the irrelevant novels evoked large frontally distributed P3 waves These large, frontal P3 waves to novels were also found to be preceded by large N2 waves These findings indicate that the P3 wave is not a unitary phenomenon but should be considered in terms of a family of waves differing in their brain generators and in their psychological correlates Author

N75-27746*# California Univ La Jolla Dept of Psychology and Neurosciences
LOUDNESS ENHANCEMENT MONAURAL, BINAURAL AND DICHOTIC
Robert O Elmasian and Robert Galambos [1975] 28 p refs
(Grants NGR-05-009-198)
(NASA-CR-143138) Avail NTIS HC $3 75 CSCL 06P

It is shown that when one tone burst precedes another by 100 msec variations in the intensity of the first systematically influences the loudness of second When the first burst is more intense than the second the second is increased and when the first burst is less intense, the loudness of the second is decreased This occurs in monaural binaural and dichotic paradigms of signal presentation Where both bursts are presented to the same ear there is more enhancement with less intersubject variability than when they are presented to different ears Monaural enhancements as large as 30 db can readily be demonstrated, but decrements rarely exceed 5 db Possible physiological mechanisms are discussed for this loudness enhancement, which apparently shares certain characteristics with time-order-error, assimilation, and temporal partial masking experiments Author

N75-27747*# Methodist Hospital, Houston Tex
SKYLAB SLEEP MONITORING EXPERIMENT (EXPERIMENT

M133) Final Report
James D Frost, Jr (Baylor Coll of Medicine, Houston) 31 Jan 1975 142 p refs
(Contract NAS9-12974)
(NASA-CR-141886) Avail NTIS HC $5 75 CSCL 06S

A summary of the conceptual design of the Skylab sleep monitoring experiment and a comprehensive compilation of the data-analysis results from the three Skylab missions is presented One astronaut was studied per flight, electroencephalographic, electro-oculographic and headmotion signals acquired during sleep by use of an elastic recording cap containing sponge electrodes and an attached miniature preamplifier/accelerometer unit are shown A control-panel assembly mounted in the sleep compartment, tested electrodes preserved analog signals, and automatically analyzed data in real time (providing a telemetered indication of sleep stage) Results indicate that men are able to obtain adequate sleep in regularly scheduled eight-hour rest periods during extended space missions Author

N75-27748# California Univ San Diego Dept of Psychology and Neurosciences
LOUDNESS ENHANCEMENT IN MAN 1 BRAINSTEM EVOKED RESPONSE CORRELATES
J W Bauer R O Elmasian, and R Galambos [1975] 22 p refs
Avail NTIS HC $3 25

Electrophysiological responses and psychophysical judgements in subjects performing in a loudness enhancement task were correlated Subjects received a tone burst followed after an interval by a signal whose loudness they were required to match by adjusting the intensity of another signal presented 1 5 seconds later They judged the loudness of the first signal to be enhanced by 15db or more when the interval was small Analysis of the electrophysiological brainstem responses evoked by both signals revealed no changes in the electrophysiological response to the first signal that could explain its loudness enhancement Results show the brainstem response to reflect stimulus intensity changes accurately, and perceived (enhanced) loudness change poorly or not at all It appears that the mechanisms mediating loudness enhancement operate at levels central to the brainstem Author

N75-27749# Saint Louis Univ Mo Dept of Physiology
THE INFLUENCE OF POSTURE ON ISOMETRIC STRENGTH AND ENDURANCE FOREARM BLOOD FLOW, AND THE BLOOD PRESSURE AND HEART RATE RESPONSE TO ISOMETRIC EXERCISE Interim Report, 1 Jun 1973 - 31 May 1974
A R Lind, R L Burse J S Petrofsky J S Rinehart, and P G Schmid 7 Oct 1974 22 p refs
(Grant AF-AFOSR-2362-72 AF Proj 9777)
(AD-A004332 AFOSR-75-0086TR) Avail NTIS CSCL 06/16

The influence of posture on isometric muscular capacity has been examined on four subjects in the sitting 45 degrees head-up, recumbent and 15 degrees head-down position The maximal voluntary contraction (MVC) of the subjects hand-grip was unaffected by posture, but the endurance time of an isometric contraction held to fatigue at 40% MVC was 20% longer in the sitting than in any other posture That difference in endurance was abolished when the circulation to the exercising forearm was occluded The blood flow to the forearm was found to be higher at rest before and after isometric contractions in the recumbent subjects than when they were sitting, but during the contractions the reverse was true and the forearm blood flow was greater when seated than when recumbent GRA

N75-27750# Woodard Research Corp , Herndon, Va
INDUSTRY SURVEY OF TEST METHODS OF POTENTIAL HEALTH HAZARD
Geoffrey Woodard Nov 1974 96 p refs Prepared for EPA, Washington D C
(PB-239840 EPA-560/5) Avail NTIS HC $4 75 CSCL 06T

Nine companies selected as representing a cross section of prominent producers of chemicals identified through four-digit Standard Industrial Classification codes were surveyed with respect to methods used to assess toxicological and environmental properties of new and existing chemicals Four progressive levels of investigational effort depending upon extent, frequency and nature of chemical use are identified single or infrequent exposure, occasional low-level exposure frequent low-level occasional high-level exposures and frequent high-level general consumer unavoidable exposures Factors influencing the decisions regarding the level(s) of investigation needed or the initiation of the next higher level series of studies are explored Author (GRA)

N75-27751# Control Data Corp Arlington Va Engineering Management Operations
ASSESSMENT OF RURAL HEATH RESEARCH EXECUTIVE SUMMARY
G Singleton and S Wyban Mar 1975 54 p refs
(Contract AG-12-01-01-5-510)
(PB-240271/7, CDC/EMO-74/01) Avail NTIS HC $4 25 CSCL 06E

Problems and possible solutions in the area of rural health research and development are presented GRA

N75-27752 British Library Lending Div , Boston Spa (England)
ON RANDOM AND TARGET-ORIENTED SEARCH
E V Oganesyan L S Gambaryan V S Artyunyan, and V G Abovyan Dec 1974 8 p refs Transl into ENGLISH from Biol Zh Arm (Erevan) v 24, no 3, 1971 p 19-23
(BLL-RTS-9493) Avail British Library Lending Div , Boston Spa, Engl £1 40, 2 BLL photocopy coupons

Strategies of the cognitive process are discussed in terms of the use of natural search mechanisms in the development of applied control algorithms Search strategies considered include target-oriented search and random search J M S

N75-27753# National Aviation Facilities Experimental Center, Atlantic City, N J
OCULOMETER MEASUREMENT OF AIR TRAFFIC CONTROLLER VISUAL ATTENTION Interim Report, Jul - Aug 1974
Gloria Karsten, Bernard Goldberg Richard Rood, and Richard Sulzer Feb 1975 27 p refs
(AD-A006965, FAA-NA-74-61) Avail NTIS CSCL 05/5

To evaluate the oculometer as a visual fixation measuring device for man/machine interface investigations, six air traffic controllers performed simulated radar control functions A seventh controller performed the control tasks, while both an oculometer record and a manual record were made of visual attention Approximately 80% of the test time was spent looking at the radar screen, while much less was spent on other instruments and miscellaneous objects Good agreement was shown between the data obtained by each method but the oculometer was more capable of recording brief eye movements and additional detail This additional precision was accompanied however, by an additional workload in data reduction It was concluded that the oculometer has the potential to produce reliable and accurate information when used within the limits of its design The addition of automatic output of fixation coordinates would be a valuable improvement resulting in reduced test workload Author

N75-27754# New Mexico Univ Albuquerque Dept of Electrical Engineering and Computer Science
TWO PROGRAMS FOR SPEECH RECOGNITION AND SYSTEM IDENTIFICATION RESEARCH Interim Report
J T Cordaro Aug 1974 29 p refs
(Grant AF-AFOSR-2178-72 AF Proj 9769)
(AD-A003808, EE-223(74)AFOSR-222-3) Avail NTIS CSCL 05/7

Two programs used for research in automatic speech recognition and in system identification are described in this report GRA

N75-27755# School of Aerospace Medicine Brooks AFB Tex
AN AUTOMATED SYSTEM TO ASSESS PILOT PERFORMANCE IN A LINK GAT-1 TRAINER Final Report, Mar 1971 - May 1972
Peter H Henry Roy A Turner and Robert B Matthie Oct

1974 69 p refs
(AF Proj 7930)
(AD-A004780, SAM-TR-74-41) Avail NTIS CSCL 05/9

A prototype control and scoring system has been developed around the Link GAT-1 trainer that permits laboratory assessment of pilot performance This system automatically presents subjects with an hour-long series of maneuver requests providing a laboratory approximation of a cross-country flight on instruments in a single-engine light aircraft Performance is scored electronically in terms of how closely subjects are able to stay within the tolerances prescribed for various flight instruments as they execute the series of maneuvers Major components of this non-computer based system are (1) two Link GAT-1 trainers (2) special display panels mounted in the cockpit of each trainer (3) a central control station (4) an assembly of special-purpose analog and digital logic for error detection and scoring and (5) paper tape perforators for data logging This report covers the basic design and circuitry details Results of performance tests using this system are reported elsewhere GRA

N75-27756# Arizona State Univ Tempe Dept of Educational Technology
MEASUREMENT OF FLIGHT PERFORMANCE IN A FLIGHT SIMULATOR Interim Report
Brian D Shipley Vernon S Gerlack and Fritz H Brecke Aug 1974 147 p refs
(Grant AF-AFOSR-2128-71, AF Proj 9778)
(AD-A004488 TR-40830 AFOSR-75-0208TR) Avail NTIS CSCL 05/9

Performance evaluation is an essential part of effective instructional research The evaluation of complex psycho-motor performances is difficult because they are typically transitory there is no permanent record trace or product after the performance is completed to indicate the characteristics of the performance The performance of student pilots in the flight simulator or in the aircraft exemplifies the difficulties stemming from the complexity of the task and from the transitory nature of performance transiency This report describes the results of a methodological study carried out to solve these problems for the purpose of evaluating student pilot performance in a flight simulator GRA

N75-27757# Arizona State Univ Tempe Dept of Educational Technology
CUES, FEEDBACK, AND TRANSFER IN UNDERGRADUATE PILOT TRAINING, PHASE 3
Vernon S Gerlach Oct 1974 20 p
(Grant AF-AFOSR-2128-71)
(AD-A003748 AFOSR-74-1894TR) Avail NTIS CSCL 05/9

Three related lines of endeavor are reported Central to all activity was continued research concerning the effect of cues and feedback on transfer type tasks Because questions arose on the effect of practice during the cognitive pre-training phase of skill acquisition an experiment was designed to study this variable A second research thrust was the continued effort to discover more effective and efficient methods of measuring student pilot flight performance The third line of research centered on the study of algorithms as a tool for the instructional designer whose responsibility it is to improve flying training procedures and techniques GRA

N75-27758* National Aeronautics and Space Administration Pasadena Office Calif
COOPERATIVE MULTIAXIS SENSOR FOR TELEOPERATION OF ARTICLE MANIPULATING APPARATUS Patent
Alan R Johnston inventor (to NASA) (JPL) Issued 10 Jun 1975 10 p Filed 31 May 1973 Sponsored by NASA
(NASA-Case-NPO-13386-1, US-Patent-3 888 362
US-Patent-Appl-AN-475336, US-Patent-Class-214-1B
US-Patent-Class-214-1CM US-Patent-Class-318-640) Avail US Patent Office CSCL 05H

Apparatus for grasping an article under remote control is provided with a sensor comprised of a photodetecting cell divided into four quadrants to define X and Y coordinates and a light emitting diode on a Z axis normal to the X and Y axes Two additional light emitting diodes are equally spaced on each side of the first diode along the X axis of the sensor The diodes are sequentially energized and images of the diodes are reflected by a target comprising two plane mirrors and a corner retroreflector mounted on the article to produce signals from the cells which when combined and nulled, will align X Y, and Z axes of the sensor with corresponding axes Xm Ym and Zm of the target, and also decrease the distance between the sensor and the mirror to a predetermined value
Official Gazette of the U S Patent Office

N75-27759* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston, Tex
MULTIPARAMETER VISION TESTING APPARATUS Patent
Stacy R Hunt Jr (GE Philadelphia), Robert J Homkes (GE, Philadelphia) Wilmer B Poteate (GE Philadelphia), and Andrew C Sturgis, inventors (to NASA) (GE Philadelphia) Issued 24 Jun 1975 23 p Filed 10 Sep 1973 Supersedes N74-32549 (12 - 22 p 2651) Continuation-in-Part of Abandoned US Patent Appl SN-160371 filed 7 Jul 1971 Sponsored by NASA
(NASA-Case-MSC-13601-2 US-Patent-3 891 311,
US-Patent-Appl-SN-395495 US-Patent-Class-351-38) CSCL 06B

Compact vision testing apparatus is described for testing a large number of physiological characteristics of the eyes and visual system of a human subject The head of the subject is inserted into a viewing port at one end of a light-tight housing containing various optical assemblies Visual acuity and other refractive characteristics and ocular muscle balance characteristics of the eyes of the subject are tested by means of a retractable phoroptor assembly carried near the viewing port and a film cassette unit carried in the rearward portion of the housing (the latter selectively providing a variety of different visual targets which are viewed through the optical system of the phoroptor assembly) The visual dark adaptation characteristics and absolute brightness threshold of the subject are tested by means of a projector assembly which selectively projects one or both of a variable intensity fixation target and a variable intensity adaptation test field onto a viewing screen located near the top of the housing Official Gazette of the U S Patent Office

N75-27760* National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
REFERENCE APPARATUS FOR MEDICAL ULTRASONIC TRANSDUCER Patent
Robert D Lee, Robert J Hudock, and Dale I Shute inventors (to NASA) Issued 8 Jul 1975 8 p Filed 21 Dec 1973 Supersedes N74-13818 (12 - 05 p 0499)
(NASA-Case-ARC-10753-1, US-Patent-3 893 449
US-Patent-Appl-SN-427395 US-Patent-Class-128-2V
US-Patent-Class-74-471XY US-Patent-Class-128-2 05Z
US-Patent-Class-128-24A) Avail US Patent Office CSCL 06B

A portable miniature ultrasonic transducer positioning apparatus is described the apparatus has a transducer receiving sleeve coupled to a pair of orthogonally orientated independently pivotable yokes The yokes are pivotably mounted to a base member A pair of potentiometers are coupled to the axes of the yokes and to a dual meter sleeve position indicator for indicating with respect to the axes of the yokes the angular position of a probe slidably fitted in the sleeve An oscilloscope or similar signal display device is coupled to the probe for providing signal readout for use in ultrasonic cardiology oscilloscope studies As an option, a ball lever assembly is provided for remotely controlling yoke position and the angular position of the sleeve and a probe fitted to it
Official Gazette of the U S Patent Office

N75-27761* National Aeronautics and Space Administration Pasadena Office Calif
HEAT STERILIZABLE PATIENT VENTILATOR Patent
Alexander S Irons (JPL) Paul P Muehter (JPL) and Willie D Kent inventors (to NASA) (JPL) Issued 8 Jul 1975 9 p Filed 7 Mar 1974
Sponsored by NASA

(NASA-Case-NPO-13313-1, US-Patent-3 893,458 US-Patent-Appl-SN-449153 US-Patent-Class-128-145 8, US-Patent-Class-55-DIG 35) Avail US Patent Office CSCL 06B

An improved heat-sterilizable patient ventilator is disclosed The device is characterized by a ported center-body a shell formed of heat sterilizable material mounted on the center-body and defining a hermetically sealed reservoir for confining under positive pressure a mixture of bacteria-free gas and a pneumatic circuit including an oxygen delivery jet coupled with an absolute filtration system for delivering bacteria-free mixture of gases to the reservoir Official Gazette of the U S Patent Office

N75-27762*# IIT Research Inst , Chicago, Ill Techno/Economic Studies Group

MARKET STUDY BIOLOGICAL ISOLATION GARMENT

May 1975 16 p ref

(Contract NASw-2645)

(NASA-CR-144350) Avail NTIS HC $3 25 CSCL 06K

The biological isolation garment was originally designed for Apollo astronauts to wear upon their return to earth from the moon to avoid the possibility of their contaminating the environment The concept has been adapted for medical use to protect certain patients from environmental contamination and the risk of infection The nature and size of the anticipated market are examined with certain findings and conclusions relative to clinical acceptability and potential commercial viability of the biological isolation garment Author

N75-27763*# Scientific Translation Service, Santa Barbara Calif

THE INTERNATIONAL ORBITAL LABORATORY

L S Khachaturyants Washington NASA Jul 1975 16 p Transl into ENGLISH from Zemlya Vselennaya (USSR) no 2 Mar - Apr 1975 p 14-20

(Contract NASw-2483)

(NASA-TT-F-16442) Avail NTIS HC $3 25 CSCL 06S

The problems encountered in space flights such as visual signalling contrast sensitivity and motor reactions are discussed The psychophysiological mechanisms are described and the problems to be solved in the Apollo-Soyuz flight are analyzed Author

N75-27764# Royal Aircraft Establishment Farnborough (England)

THE DRIVING SEAT ITS ADAPTATION TO FUNCTIONAL AND ANTHROPOMETRIC REQUIREMENTS

R Rebiffe May 1975 22 p refs Transl into ENGLISH from the French

(RAE-Lib-Trans-1841 BR48031) Avail NTIS HC $3 25

The relationship of the drivers seat with the various functions to be carried out from the driving position was considered The study included (1) analysis of the drivers task (2) determination of the body posture which best meets the task requirements, and (3) definition of the seat characteristics giving optimum support to the driver in this posture The main characteristics of the seat obtained were the seating height, the location and extent of the adjustment zone the seat back inclination, the cushion inclination and the static consistency of the cushion Author

N75-27765*# Scientific Translation Service Santa Barbara Calif

THE SPACE WATCH IN SALYUT AS ON THE EARTH

N Zheleznov Washington NASA Jul 1975 6 p Transl into ENGLISH from Gudok (USSR) 9 Jul 1975 p 4

(Contract NASw-2483)

(NASA-TT-F-16468) Avail NTIS HC $3 25 CSCL 06S

Medical-biological experiments carried out onboard Salyut space station are described The equipment used to train the cosmonauts is briefly discussed Author

N75-27766# Aerospace Medical Research Labs Wright-Patterson AFB Ohio

EVALUATION OF A WATER-COOLED HELMET LINER Final Report, Mar - Jun 1974

Abbott T Kissen, Willi J Buehring Robert D ODonnell Walter C Summers and David C Smedley Nov 1974 28 p refs (AF Proj 7222)

(AD-A004776 AMRL-TR-74-135) Avail NTIS CSCL 06/17

Five subjects completed four 80 minute heat exposures (46C (115F) 40% relative humidity) twice wearing the water-cooled helmet liner and twice without for a total of 20 heat exposures During the thermal exposure, the subjects accomplished psychomotor performance tests Physiological measurements included mean skin rectal and body temperatures mean heart rate body heat storage sweat loss and Physiologic Index of Strain The performance measurements included tracking mental arithmetic visual-motor response time and auditory differentiation tasks Head cooling significantly reduced the magnitude of all the physiological responses The effect of head cooling on psychomotor performance was less impressive The overall results indicate a lack of performance decrement as a result of the heat loads used here and no differential effect of head cooling on a subject s performance GRA

N75-27767# Aerospace Medical Research Labs Wright-Patterson AFB, Ohio

BREATHING AIR QUALITY UNDER THE FIRE PROXIMITY SUIT HOOD Final Report, 29 Nov 1973 - Jun 1974

Abbott T Kissen Walter C Summers Willi J Buehring and David C Medley Nov 1974 14 p refs

(AD-A004770 AMRL-TR-74-76) Avail NTIS CSCL 06/17

Four subjects wearing the fire fighters proximity suit (except for gloves) were exposed to low and moderate exercise regimens on a treadmill These exercise levels plus a resting condition were combined with auxiliary air ventilation flow rates of 5 or 10 liters/minute and nonventilated conditions A continuous sample of the breathing atmosphere under the hood was evaluated for CO2 and O2 content throughout the ten minute exposure periods The increases in heart rate are solely related to the level of exercise and were not influenced by the presence or magnitude of auxiliary air ventilation Under the most severe conditions of this study O2 and CO2 values did not attain levels of clinical significance Increased activity in operational situations is a distinct possibility and CO2 levels could be elevated an additional 2-3% generating undesirable symptoms The added weight and cost penalties of an auxiliary air ventilation system must be balanced against the possible development of an undesirable breathing environment of questionable operational significance GRA

N75-27768# Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab

A MECHANICAL ARM CONTROL SYSTEM

Richard C Waters Jan 1974 43 p

(Contract N00014-70-A-0362-0005)

(AD-A004672, AI-M-301) Avail NTIS CSCL 06/4

The paper describes a system for controlling the motion of a mechanical manipulator primarily through software rather than hardware In addition, much attention is paid to what characteristics such a system should have so that the manipulator can be conveniently directed to perform complex tasks GRA

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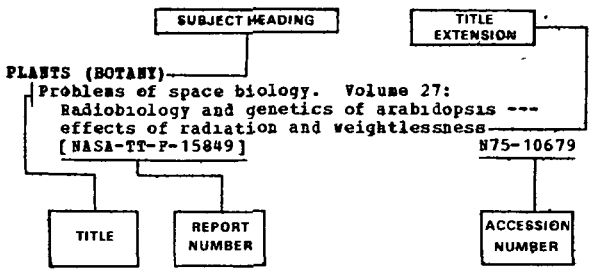

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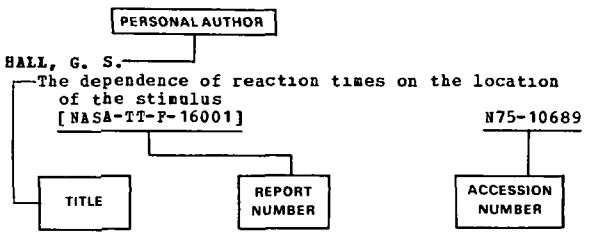

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